KAZAKHSTAN
TEMIR
ZHOLY

A DISCUSSION OF BUSINESS PLANNING & RESTRUCTURING ISSUES

FOR THE PERIOD
1999-2015

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A DISCUSSION OF BUSINESS PLANNING & RESTRUCTURING ISSUES

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JHWinner Inc

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ACKNOWLEDGEMENTS

This report culminates the fourth in a series of projects completed by the authors for Kazakhstan's railways and the government of Kazakhstan. We are encouraged that discussions about railway operations, restructuring and financial issues are becoming easier. We are beginning to understand the intricacies of rail and transport institutions in Kazakhstan. And, our counterparts in Kazakhstan are beginning to understand how we see railway transport issues. We especially want to applaud KTZ for proceeding with an outside audit and making available audited financial data.

We would like to acknowledge the work that KTZ and the Ministry of Transport and Communications have done to develop creditable restructuring and operating reform proposals. It is our hope that the discussions contained in this report and the tools delivered with it will assist those who make and implement rail and transport policies in Kazakhstan.

We would also like to acknowledge the assistance provided to us by the EBRD office in Kazakhstan and the work of the EBRD's London based Transport Group in reviewing and commenting on the reform and investment proposals contained herein.

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I INTRODUCTION

In December 1996, the Government of Kazakhstan reorganized its Railway Ministry to form a national railway enterprise, Kazakhstan National Railways, or Kazakhstan Temir Zholy (KTZ). This reorganization began a process of the reform and restructuring of the railway industry in Kazakhstan. While reforms have already had a significant impact on railway and Ministry functions, the restructuring process is only now beginning. Although financial performance improved significantly in the past few years, it began deteriorating again in 1998. KTZ costs are still too high, and the requirement for external government funding still too great. KTZ cannot fund a replacement level investment program that will sustain the railway over time. The economic collapse of The Russian Federation, a major trading partner of Kazakhstan, has put the railway at greater risk and necessitates continuing and more rapid reform.

To address these issues, KTZ has prepared three documents in draft form and reviewed them with government:

1. A **Restructuring Program** which includes separation of "monopoly" and "competitive" functions of the railway and offers the potential for privatization some of the "competitive" functions.

2. An **Investment Program** defining "minimum" investments of US$1.6 billion for the next five years.

3. A **Program for the Optimization of Railway Operations** which describes some cost reduction and operations improvement methods that will be used to implement the Restructuring Program.

KTZ is currently in the process of preparing a **Business Plan**, which will integrate the programs described in the above documents into a viable strategy and plan for KTZ's future. The Business Plan will describe the major issues that railway restructuring must address and lay out the details of the restructuring program. The Business Plan will also analyze the expected economic environment within which KTZ must operate and project future freight and traffic volumes and revenues. Based upon these projections, the Business Plan will outline the future structure of the enterprise, investment priorities, and actions necessary to bring costs and assets into alignment with expected financial performance. Finally, the Business Plan will discuss the expected financial performance of the company and identify key financial changes, including any necessary government subsidies or other outside borrowings.

This report has been prepared as a part of a due diligence process for the European Bank for Reconstruction and Development (EBRD). It provides a brief background on Kazakhstan's railways and describes how initial reform efforts, necessitated by the breakup of the Soviet Union, left Kazakhstan's railways in a precarious financial position. It outlines some of the critical problems faced by Kazakhstan and its railways. Finally, this report discusses and analyses KTZ' planned actions and identifies the critical institutional changes, management actions and investments necessary to overcome the most serious issues.

Analysis shows the plans defined in the three documents described above are not sufficient to provide a financially viable railway enterprise in Kazakhstan. The restructuring programs move KTZ in the right direction, but are of insufficient magnitude. Some elements of the restructuring move KTZ in an inappropriate direction and should be revised or the direction of railway reform re-thought.[1] The investment program, while containing needed investments, is too large for KTZ to afford with the traffic and pricing structure that can be prudently expected in the future. The program for reducing operating costs moves railway operations towards greater efficiency, but to achieve financial viability, additional changes in operating practices will be necessary. This report contains an analysis and discussion of KTZ's expected future traffic and a review of the operating reform, restructuring, and investment programs that KTZ should consider in developing its Business Plan.

The discussions and observations contained in this report are those of the JHWinner, Inc. consulting team and do not necessarily reflect the views of KTZ, the government of Kazakhstan, or the EBRD. The discussion and observations contained in this report have been prepared to support EBRD's loan decision and have been designed to help KTZ in the preparation of its Business Plan.

[1] In particular, the separation and possible privatization of customer service functions is inappropriate unless KTZ is to be restructured as a state-owned infrastructure company with private operating companies providing freight services over the infrastructure. In this case, the infrastructure company should not provide operating services, and should not own locomotives, freight cars, or other rolling stock (except for infrastructure maintenance purposes). The operating companies should provide those resources (either by ownership or lease) and employ all operating employees.

II BACKGROUND & KTZ PROPOSALS

In the late 1980s, the Railways of Kazakhstan, then part of the Soviet MPS (the Soviet Railway Ministry) were among the most productive and highest density railways in the world. There were three major railways in Kazakhstan: the Almatinsky, Tselinnaya, and West Kazakhstan Railways. MPS railway planning, operations and financial structures and institutions controlled their production, revenue, investment and most other aspects of operations and finance. MPS regulations covered all aspects of railway activities, from pricing to safety and design standards. MPS collected revenues and disbursed funds to finance railway production for State Orders and for investment purposes. Individual railways had little need for marketing or independent pricing functions and acted as production units within the MPS structure.

The MPS was largely self-funding and produced a significant surplus for the National Budget. National Budget funding was used only for special projects of national importance (*i.e.*, the construction of the Baikal Amur Railway, better known as the BAM, across central Siberia). The MPS made extensive use of cross-subsidies to provide social infrastructure and services throughout the Soviet Union, including extensive commuter services, a large national passenger network, and low transport prices for some goods and commodities to enhance national development.

The Kazakh railways played a significant role in national and regional development. Portions of the Trans-Siberian Railway passed through Kazakhstan and carried large volumes of freight and passenger traffic. In addition, Kazakhstan's rich coal and ore deposits produced prodigious amounts of natural resources for the Soviet economy. The Ekibastuz coal deposits, some of the largest in the world, provided coal for electric utilities throughout the region. The coal deposits near Karaganda provided coal for steel production at one of the largest steel plants in the world. Other natural resources included bauxite, chromium and other ores and minerals used in the national economy. The railways of Kazakhstan provided vital and necessary transport services and were at the forefront of heavy-haul developments. The Tselinnaya Railway still holds the world record for the longest train ever operated.

With the breakup of the Soviet Union and formation of the independent Republic of Kazakhstan, Kazakhstan's railways became the property and responsibility of the new government. The Government of Kazakhstan formed new institutions and developed policies to provide the direction and management needed for state-owned transport enterprises.

A new Ministry of Transport and Telecommunications provided transport policy and direction for Kazakhstan, while CIS railways sorted out boarder differences, settled locomotive and wagon share distributions and began to manage their own financial affairs. In Kazakhstan, this included forming a railway bank to manage cash collections for all Kazakh railways and an insurance company to spread risk. In spite of these measures, breakup of the Soviet Union resulted in significant economic dislocations, trading patterns were disrupted, and the economies of all CIS countries slumped.

By early 1996, Kazakhstan's railways were on the verge of bankruptcy. Their financial problems stemmed from a severe reduction in traffic volume (about one-third the traffic of 1990) and significant problems in collecting payment for transport services. As the economy restructured and evolved from a planned to a market economy, GDP plummeted and trade with Russia and other CIS countries collapsed. To keep essential services operating, the Government of Kazakhstan made the railways an arm of its foreign policy, directing it to transport coal to utilities in Russia and goods from Uzbekistan in exchange for electricity, gas and oil for Kazakhstan and other state-enterprises. Payments arrears (accounts payable) increased alarmingly. At times during 1995 and 1996, railway workers went unpaid for more than six months.[2] Most railway materials and supplies had to be acquired through barter. In 1996, barter represented 65% of railway revenue. Even so, the railways were expected to pay VAT and other taxes on imputed income.

The government of Kazakhstan took many measures to reform the economy and the structure of state enterprises. As the economy evolved, many companies with payment arrears were privatized or placed under private management contracts. As part of this privatization process, payment arrears to other state enterprises, including railways, were forgiven. So far, the taxes railways paid on these imputed (but not collected) revenues have not been forgiven.

In early 1997, the government formed a single railway organization, Kazakhstan Temir Zholy (KTZ), to help solve the serious financial problems faced by the individual railways. At the same time, the Kazakh economy began to show new signs of life. An improving economy, substantial rate increases and some important steps to reform practices and cash collections began to ease the financial pressures on KTZ in 1997. The railway produced an operating profit in that year. The Asian and Russian crises have reduced economic activity in Kazakhstan and railway traffic fell again in 1998. The railway remains short of cash. No significant investment has been made in infrastructure renewals or equipment replacements for the past seven years. Although traffic has declined substantially, a backlog of deferred maintenance and investment exists. KTZ still records substantial losses on passenger traffic and continues to rely on trading offsets[3] for fuel, electricity, and many materials.

2.1 The KTZ Network

The KTZ network consists of some 26,900 track-kilometers over a network of 13,300 route-kilometers. The network includes nearly 5,000 kilometers of double track mainline and about

[2] KTZ became current with payroll in mid-1998 and has paid employees on time since then.

[3] Methods for settling accounts receivable have moved from barter to a sophisticated system of revenue/cost offsets wherein companies trade services between one another under predetermined values and contract like conditions. Such account settlements are called "offsets".

8,700 kilometers of station yard tracks. Traffic is concentrated along several major corridors, as shown in the map below

Major traffic flows are from the coal region around Ekibastuz to power plants in Russia and from the industrial complex at Karaganda both north and south to Russia and Southern Kazakhstan. Additional sources of significant traffic are in the industrial area between Chu and Ayres, the location of oil and ore processors.

Even though traffic has dropped sharply from 1990, KTZ is a high-density network, averaging more than 18 million-tonnes per route kilometer and 14 million-tonnes per track kilometer (not including station and yard tracks). KTZ has an unusually high proportion of station and yard track relative to its network but operates relatively few kilometers of light density lines (approximately 1,900 kilometers of line with less than 1.5 million tonnes per kilometer).

Kazakhstan also has a number of industrial railways, not shown on the map above, which serve mines, utilities, oil fields and other specialized markets. All of the network show above is Russian Gauge.

2.2 KTZ Employment

KTZ is Kazakhstan's largest employer. In 1998, KTZ employed about 152,500 staff, up some 2,500 from 1997 but down 9,000 from about 161,000 employed in 1995.

KTZ Employment by Department	
Passenger	4,013
Coaches	11,000
Freight & Commercial	17,810
Locomotives & Drivers	31,743
Wagons	15,603
Track	27,702
Civil Works	4,000
Signals & Communications	11,095
Power & Electrification	5,585
Security	4,500
Purchasing & Stores	600
Management & Other	3,500
Core Railway Total	**137,160**
Non Transport Employment	15,274
Total KTZ Employment	**152,434**

The largest changes have come in the Civil Department where employment has declined from some 12,000 in 1995 to the approximate 4,000 shown in the table above. Much of this change reflects a reclassification of construction units to the non-transport category. Employment in the core railway climbed from 134,000 to 137,000 between 1996 and 1998, reflecting increases in track, signaling and passenger department employment.

Non-transport sector employment includes medical and educational facilities as well as some production and construction units (*e.g.*, heating and water facilities). Prior to 1997, employees in these groups were grouped under different departmental headings or were unreported (*e.g.*, security forces were not reported prior to 1997) so comparisons are difficult. Since 1997, KTZ has succeeded in transferring many social service non-transport facilities to various local governmental units. These transfers are responsible for some of the employment decline between 1995 and 1997.

In the latest employee counts available (February, 1999), KTZ core railway employment appears to have dropped by some 8,000 from 1998 staffing levels. These declines are concentrated in Coaches, Locomotives & Drivers, Freight and Commercial Services and Passenger Departments. KTZ management reports that normal attrition for the enterprise had been as high as 12% in recent years but had dropped of late to about 9%.[4] KTZ management reports that it has a general agreement with government to trim forces by as much as 60,000 over the next two years.

[4] Mr Vagon, Deputy General Manager of Human Resources, reports that skilled-trades labor currently has an attrition rate of 3%-5%, and general labor rates ranging from 10% to 12%

2.3 Issues and Objectives of Restructuring

Railway transport is essential for the development of the economy of Kazakhstan. The railway provides some 80% of freight transport and 58%[5] of passenger transport. Because of this dominance, the cost of railway transport has a significant impact on the competitiveness of industry and the efficiency of Kazakhstan's economy. In the past, railway traffic was nearly 3 times current levels. However, KTZ's railway network and cost structure have not changed significantly. Consequently, it has generated significant financial losses. KTZ has reduced asset renewal investments to compensate, but this method of saving cash cannot long continue. Government has approved substantial tariff increases, raising transport prices. These actions, too, have been insufficient to bring enduring economic health to KTZ, and are harmful to the overall economy in the end. Higher tariffs, increased traffic, and better control of costs helped KTZ generate a small operating profit in 1997. However, economic collapse in The Russian Federation, Kazakhstan's largest trading partner, and continuing economic turmoil in Asia have reduced KTZ traffic significantly and are forecast to reduce rail traffic for several years.

KTZ is both labor and capital intensive. To reduce its costs and improve its physical and financial performance, it must become less labor intensive and use its assets much more intensively. That will require significant reforms in operating practices and new investment—investment that KTZ cannot finance by itself as a government entity. To begin to control labor and operating costs, KTZ must change its internal management structures.

Restructuring is necessary to transform KTZ and to build a rail supply industry from internal KTZ units. However, because of the importance of railway transport to the economy of Kazakhstan, it will be necessary to approach the transformation of KTZ carefully and in stages. The ultimate goal of railway transport-sector reform is to reduce total business logistics costs in the economy,[6] and create a self-sustaining, economically viable rail industry.

Currently, however, the need to provide loss-making passenger and other services requires cross-subsidization from higher tariffs on freight traffic. KTZ has estimated that the subsidies for passenger losses alone cause freight traffic tariffs to be 12% to 14% higher than would otherwise be necessary.[7] Reductions in freight tariffs would improve the competitiveness of Kazakhstan's industries and improve the overall efficiency of the economy. While there is government oversight of KTZ tariffs, there is no mechanism to provide for loss making services other than through cross-subsidies.

2.4 Railway Structure

When the Republic of Kazakhstan was formed, three major railways and many industrial railways were organized along the lines of the former MPS railways. A crucial difference in Kazakhstan, however, was that the railways collected transport revenues directly rather than through a Railway Ministry. The general organization is shown in the diagram below.

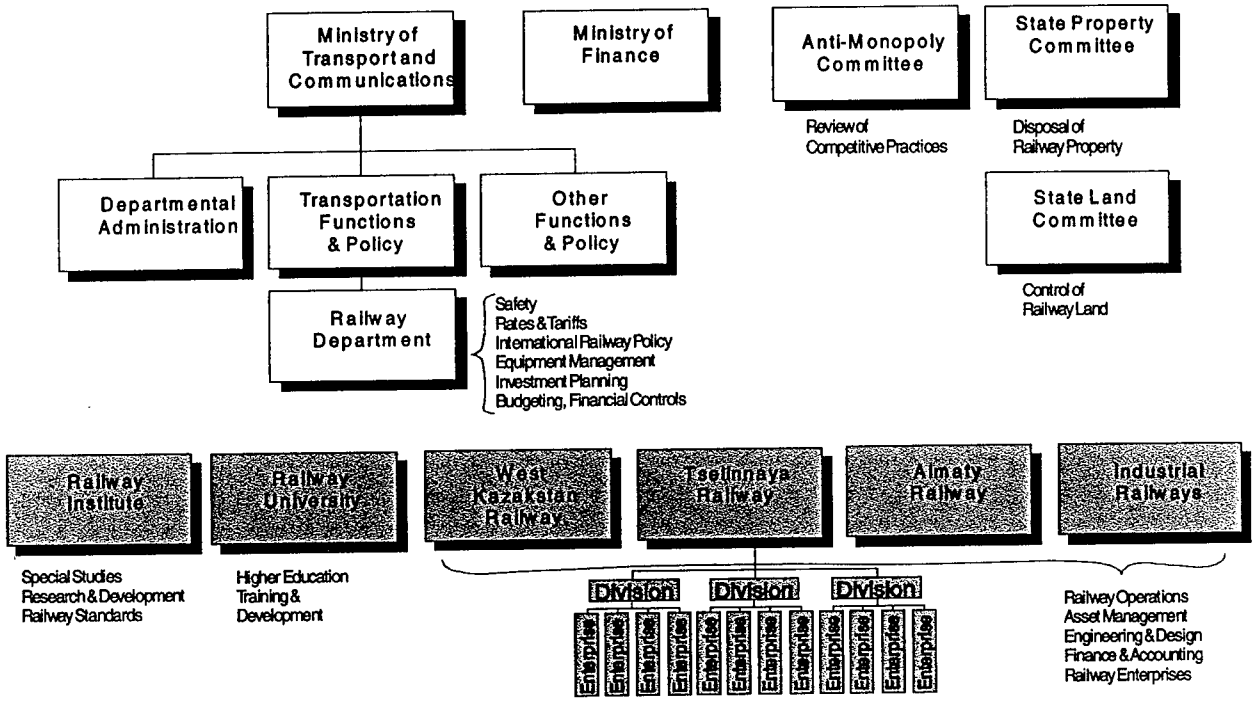
[5] According to the Railway Restructuring Plan prepared by KTZ

[6] *ibid,* Section 1, page 2

[7] *ibid,* Section 1, page 2

Each railway had its own management structure and managed its own revenue collections. Each division was organized as a collection of independent enterprises at the station level. Each enterprise kept its accounts and paid taxes on its income. Each enterprise was relatively autonomous and worked within an allocation of the overall freight tariff based upon activity. This resulted in significant financial dislocations, higher tax payments than an integrated enterprise would pay and limited central control over spending. As the economy declined and payment arrears became a serious problem, the independence of these entities and their importance to local governments made reform exceptionally difficult.

Kazakstan Governmental Organizations Directly Involved In Railway Issues



Kazakhstan's railways were a part of the Ministry of Transport and Communications until January 1997. At that time, KTZ was formed as an independent, state-owned enterprise. Management of the three railways was combined, along with the responsibility for rate setting (with oversight from the Ministries of Transport and Communications and Finance), management and distribution of equipment, and financial affairs. The new railway organization consolidated the independent railways and formed a centralized headquarters with 12 divisions. Under this structure, KTZ management began to implement financial reforms. The office of Chief Accountant was established to combine the accounts of the three railways and handle serious accounting issues (*e.g.*, barter trade accounting, account settlements with neighboring railways, and accounting for taxes and forgiven debts).

These reforms were aided by close working relationships with Kazcommertz Bank, one of Kazakhstan's leading commercial banks, which provided financial advice and commercially experienced management staff. Since this alliance, KTZ has made progress in reducing accounts payable and in injecting commercial management practices into the railway organization.

KTZ's 12 railway divisions remained relatively autonomous and manpower and cost control continued to be difficult. Even so, KTZ was able to reduce its extensive structure of social services (*i.e.*, schools, medical facilities, social clubs, etc), turning some of them over to local governments. Less progress was made in reforming work practices, lowering costs and rationalizing railway structures. New reforms and a new strategy are needed to complete the restructuring process and commercialize Kazakhstan's railway industry.

2.5 KTZ Preliminary Reform Programs

KTZ staff have developed three programs in draft to improve the financial performance of the railway. Those programs include a Restructuring Program, dealing with changes in the structure of KTZ itself and proposing some changes in the relationship between KTZ and the government. An Operations Optimization Program is designed to reduce operating costs and introduce new operating methods. Finally, the draft Investment Program implements a reform program and provides for asset renewals. The major elements are described briefly below.

2.5.1 Restructuring Program

In January 1999, KTZ changed its internal organization to put the next phase of restructuring into place. In this phase, competitive elements of the railway will be formed in to Subsidiary State Enterprises (SSE's) and accounting changes will be introduced to give each SSE it's own accounts. In its new structure, KTZ has consolidated three regional railways and 12 railway divisions and based rail management structures on a departmental structure. Each department with geographic management responsibilities has its own geographic structure. Some departmental units have three regional offices, others have five, some more. This structure reduces the degree of autonomy that once characterized the three regional railways and local enterprise units. The autonomy made management of rail staffing, standardization, and cash management very difficult. The reduced autonomy will give KTZ managers greater control over core railway services, staffing levels, costs, and cash.

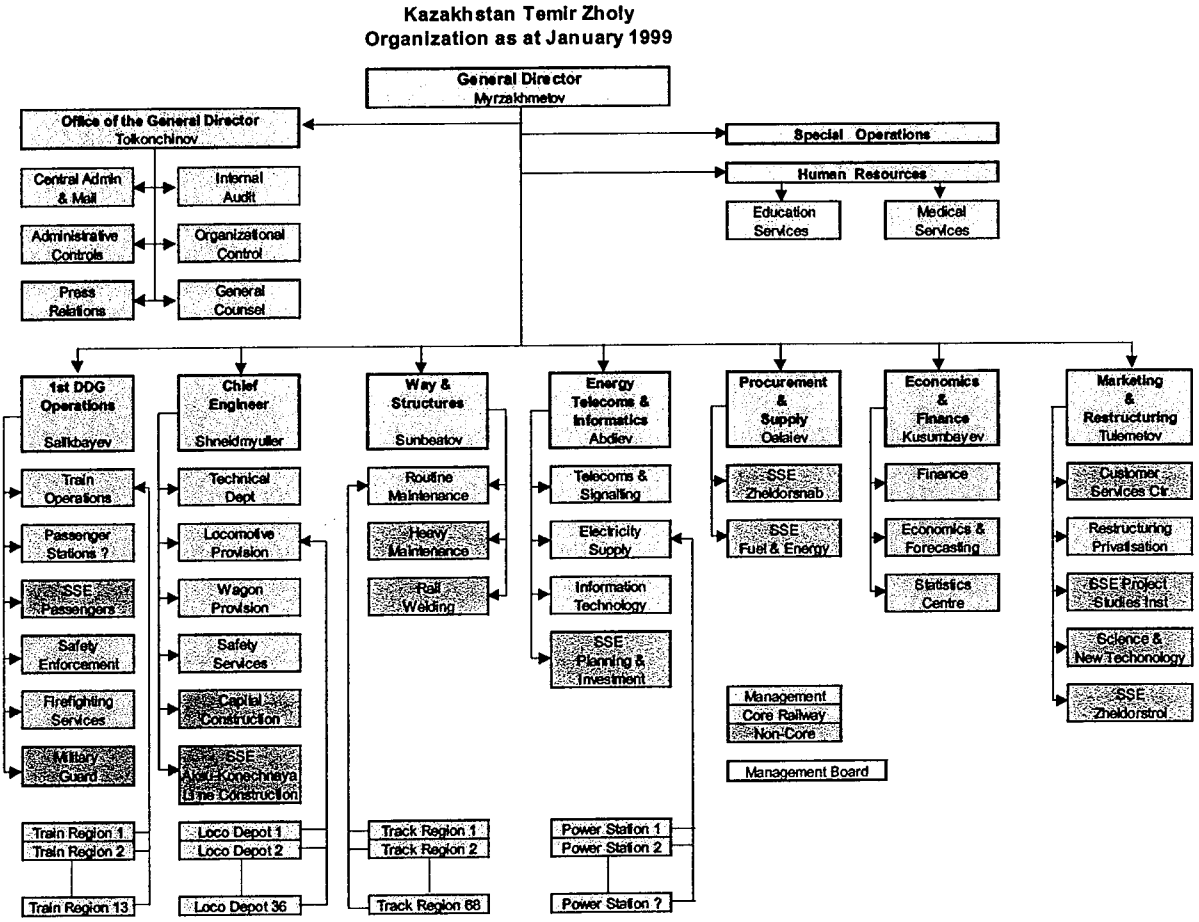
It is hoped that these and other changes described below will help to control costs and improve utilization of railway assets. The central departments, at headquarters level, will provide policy guidance, centralize control of rolling stock where necessary, and develop unified maintenance standards and practices. Purchasing and barter operations will be centrally controlled to take advantage of the economies of scale associated with modern centralized financial and accounting systems.

KTZ's Restructuring Program includes substantial institutional reform measures, potential privatization of non-core elements of the railway, and the development of a new tariff system. A significant element of the reform plan is the separation of what the KTZ plan calls the "monopolistic" elements of the industry from "competitive" elements. In the first stage, this will result in the separation of:

- **Monopoly Railway Elements**: Main-line infrastructure, electrification and power supply, signaling and train control, locomotive fleet ownership and management, train operations, common wagon fleet ownership and management, train inspection and safety;

- **Potential Competitive Elements**: Freight and passenger service delivery, locomotive and wagon depot, heavy track maintenance, design, operation of shunting services and specialized transport services such as container terminals, warehousing, loading and unloading and customer interfaces.

The Restructuring Program calls first for the separation of "competitive" elements into a series of Subsidiary State Enterprises (SSEs) and later for the corporatization of some SSE units. Still later, a small proportion of units within the SSEs may be privatized.



The KTZ restructuring plan also proposes to form a passenger services business unit, manage it to reduce costs, corporatize it and eventually separate it completely from KTZ—either by privatization, or by transfer. KTZ's plan contemplates a possible reduction in *freight* tariffs to reflect the elimination of cross-subsidies from freight to passenger services. These freight reductions attract additional freight traffic but are only viable if KTZ can reduce its freight operating costs.

The current restructuring plan forms the entities to be privatized but does not include the privatization itself. If these entities were to be privatized, a new supply industry could develop within Kazakhstan. Such a privatization effort would have a significant impact on the structure and staffing of the core railways within KTZ. Implementation of the restructuring program will begin to build a competitive railway supply industry, a more efficient core railway, a stronger infrastructure and clearer relationships between railway units and government.

2.5.2 Operations Optimization Program

The Program for Optimization of Operations is a systematic effort to identify significant cost elements and develop suggestions to reduce costs. The program considers the traffic flow changes that have occurred over the past few years and develops several methods for reducing costs, including:

- *Categorizing Track:* Track categories based upon speed and tonnage are used to develop differentiated performance standards for each category. Different materials policies and maintenance standards are derived for each standard. This is a laudable and long overdue effort that fits well with the track maintenance-method cost reduction effort supported by proposed investments in mechanized equipment (to be financed by the US$60-million EBRD loan).

- *Track Maintenance Methods*: The operations optimization paper describes the use of new track maintenance methods to accomplish track renewals and normal maintenance and repairs. These changes depend upon the use of new mechanized methods of track maintenance and an inspection based method to determine when maintenance inputs are required. This effort also envisages changes in the organization of track maintenance forces, including the privatization of some mechanized gangs to develop a basis for outside contracting of track renewals work. This effort requires investment in mechanized maintenance and inspection equipment.

- *Train Operations Optimization:* Another part of the operations optimization program includes changes in train schedules and frequencies to increase train size and reduce shunting needs. These techniques have already reduced locomotive and wagon fleet requirements somewhat. This will continue to be a fruitful area to achieve increases in operating efficiency and should lead to closing a number of shunting terminals and increased freight and passenger train productivity.

- *Automated Train Dispatching and Control Centers:* The program also develops ideas for consolidation of train dispatching centers. This program, coupled with the improved operating schedules, can reduce operating costs and improve dispatch efficiency. It, too, requires investment in new technology for automated traffic control equipment.

- *Consolidation of Stations and Terminals:* The Operations Optimization program includes recommendations on the consolidation of stations and freight terminals to reduce the number of lightly used facilities and improve the efficiency of freight and commercial services functions. Coupled with computerization and automation of billing and train formation information, this program promises to increase the efficiency of clerical and station staff.

- *Locomotive Maintenance and Management:* A portion of the Operations Optimization Program deals with changing locomotive maintenance and fleet management practices. Key elements include methods of valuing locomotives for book purposes (to reduce depreciation charges), lengthening locomotive runs to improve utilization, and changes in the structure of locomotive maintenance work. In addition, the program assumes the acquisition of nearly 191 new two-unit main-line diesel locomotives accompanied by the retirement of some 531 two-

unit diesel locomotives. Some of the changes in maintenance practices will improve locomotive utilization and increase productivity of locomotive department staff.

- *Wagon Maintenance and Management:* A program to extend the standards for wagon overhauls and changes in how and where maintenance is performed are proposed to reduce wagon maintenance costs.

- *Passenger Traffic Optimization:* The optimization program includes a scheme for motivating conductors and on-board staff to increase fare collections (they get to keep part of the collections), changes in coach management, and the "attraction of additional passenger traffic".

- *Other Elements of the Program:* The program also addresses changes in communications, computer, signaling and power supply systems that largely rely on investment programs.

The Operations Optimization Program initiates many efforts to improve KTZ cost structures and raise asset utilization. These will be key to the development of a financially viable rail industry in Kazakhstan.

2.5.3 Investment Program

KTZ has prepared two five-year investment programs, one totaling more than US$2.8 billion and a "minimum" investment plan of some US$ 1.6 billion. In the "minimum" investment plan, spending by major element is shown in the table:

Investment Element	**US$ (000,000)**
Track Renewal and Strengthening	$ 690
Locomotive Fleet	480
Track Machinery	100
Wagon Fleet	90
New Line Construction	70
Rolling stock Depots	50
Communications, Dispatching, Signaling	30
Information Systems	25
Power Systems	1
Other	75
Total	**$ 1,611**[8]

The largest element of the investment plan is for track renewal and strengthening. The program includes a blanket amount for the network (US$ 570 million) plus specific sums for upgrading the Drushba-Preznogorsk line, overhaul of artificial facilities (embankments, cuts, tunnels, etc), and maintenance of track roadbed. In many countries and for commercial railways, money spent for renewal of existing facilities, including tracks, artificial facilities, and roadbed is treated as an expense rather than an investment. KTZ's traditional track renewal methods (complete replacement) made capitalization of such expenses logical. As KTZ changes maintenance methods

[8] KTZ *Investment Programme for 1999-2003,* Draft as of 19 December 1998.

to component replacement techniques, it will become more difficult to evaluate whether a replacement should be capitalized or expensed as normal track maintenance. Tax law and financial requirements of lenders will determine KTZ's best accounting treatment for such expenses.

The investment plan also includes US$ 480-million for locomotive units. The Operations Optimization Plan describes an investment for 190 two-unit diesel-electric locomotives but the Investment plan includes "160 new diesel locomotives". KTZ has been considering various ways to renew its aging diesel locomotive fleet including continuing to overhaul and maintain the existing fleet, rebuilding and re-engining units, or buying new units. The investment program makes a provision for new locomotives. KTZ should do an analysis of the life-cycle costs of various locomotive alternatives to better determine the best fleet replacement alternative. Western designed diesel-electric locomotives are recognized worldwide as the most cost-effective solution for heavy-freight operations. It is not clear at this time whether new western designed diesel-electric locomotives will be manufactured for Russian gauge. GM has produced some units that rely on soviet-designed bogies; several of these units will be shipped to KTZ for testing this year. GE has produced kits for engine replacement using soviet-design bogies and traction motors; KTZ has several of these rebuilt locomotives operating currently. It is our understanding that they are pleased with the prime movers but not satisfied with the below-the-deck components (bogies, traction motors, braking equipment) since they still require frequent shopping (every 7 days) for inspection and lubrication. Further testing and cost analysis will determine whether new or rebuilt units are acquired.

The Investment program includes some US$ 100-million for various types of track maintenance equipment. Included are mechanized equipment for tamping, sleeper replacement, ballast cleaning and compaction machines. The investment program also includes a rail-grinding train, track inspection equipment (both track geometry and rail testing). and tools for basic maintenance forces. An analysis of KTZ's track equipment investment program indicates that a portion of it (about US$ 30-million) is duplicative (the same equipment appears to be included in two lists). The US$ 60 million EBRD financed track equipment is contained in the program. The track-maintenance equipment provided is, however, sufficient for only about one-third of the railway (the EBRD financed program).

The wagon fleet is renewed with a US$ 90-million wagon overhaul program (unspecified wagons). And, a new line is constructed from Aksu to Konechnaya for about US$ 70-million. The new line permits traffic to flow from central Kazakhstan to east Kazakhstan (moving coal from Ekibastuz coal area directly to the Semipalatinsk area) over a much shorter path. Funds are also provided in the investment program to complete the passenger coach depot.[9] Other elements of investment include funds for consolidation and automation of dispatching systems, improved data and radio communications, computer systmes.

Our financial analysis, however, shows even the minimum investment program is too much for KTZ to finance over the next five years. An alternative investment program is suggested in Chapter 4 (Section 4.5) that addresses the railway's most critical renewal, restructuring and cost reduction needs.

[9] Financed by Japanese funds

2.6 Government Relationships

Currently, KTZ is a state-owned enterprise with extensive dealings with governmental organizations at many levels. The principal relationships are discussed below.

2.6.1 KTZ Relationships with the National Government

Of course, KTZ is a national state-owned enterprise. It has many dealings with the national government on issues ranging from investments, to taxes, to services provided and prices charged. For example, tariff increase proposals are developed by KTZ and approved by the Ministry of Transportation and Communications (MoTC). MoTC then presents the approved pricing structure to the Ministry of Finance (which is now responsible for the functions once performed by the anti-monopoly committee). In 1998, the Ministry of Finance mandated significant discounts (as much as 50%) for some shippers in an effort to help grow certain segments of the economy. KTZ apparently has only limited means to determine whether certain traffics are profitable. There appears to be no formal structure to determine whether tariffs are appropriate.

In the past, all railway assets were state property and the State Property Committee claimed any proceeds from the disposal of state assets (either through sale, scrapping or transfer to customers). Consequently, Kazakhstan's railways have had little incentive to eliminate unused assets or to re-deploy railway assets to new uses. While this issue appears to have been resolved for physical assets like railcars and locomotives, there is little agreement on what happens with the proceeds from privatization of whole KTZ business units, or in the disposition of land not needed for railway operating purposes. The uncertainty in defining ownership of railway assets remains a potential obstacle to privatization of rail units. Government and railway must develop privatization proposals that: (1) provide incentives for re-allocation of assets to more productive uses, and (2) make ownership rights associated with privatized assets clear for the buyers.

Additional involvement of national government may be required in some areas. KTZ has made some progress, working with government departments, in moving the responsibility for many social services to government units. Further progress on these issues may require new legislation or national education, medical and other social programs.

In its Restructuring Program, KTZ proposes a more direct trade-off for continuing operation of loss-making rail services such as most passenger services and some light density freight operations. In the past, the government has approved higher freight tariffs on profitable freight traffic so that the railway could cross-subsidize loss-making services. KTZ has proposed ending eliminating light density branch lines and transferring passenger services to a different entity. KTZ proposes to reduce freight tariffs (an estimated 12%) if it can eliminate the need to cross-subsidize loss making services. This strategy would pass benefits to shippers, who, in theory, will become more competitive and increase their own profitability. The cost to government could be significant—an estimated Tenge 7.5 billion in 1999. KTZ *could* also be required to provide access to any independent passenger service enterprise(s) at below cost, thus continuing the cross-subsidy.

There appears to be a tacit agreement between KTZ and Government regarding employment changes. KTZ has not reduced employment in line with traffic changes since 1990. It is unclear whether KTZ will be able to make significant reductions now without approval of government.

2.6.2 KTZ Relationship to Local Governments

In the past, Kazakhstan's railways provided many social services, including schools, universities and hospitals to their employees and many local communities they served. However, the government of Kazakhstan has been working with state-owned enterprises to transfer community welfare assets and responsibilities to local government units. This transfer of responsibilities is expected to continue in the future as KTZ adjusts its employment and network to fit its needs.

In 1997, KTZ approached several communities for financial support for loss making commuter operations. Some communities have refused and KTZ is eliminating or reducing commuter services in response. In addition, as it sheds social services and seeks recovery for commuter operations, the nature of railway involvement with local governmental units is changing.

Cross-subsidizing one service by charging higher prices for another reduces the ability of a market economy to efficiency and effectively allocate labor, capital, and management talent. KTZ's early efforts to reduce cross-subsidies should continue and local or national governments should be responsible for services that benefit the nation or local communities. The concept of Public Service Obligation (PSO) contracts is well established and practiced world-wide as a means for governmental units to acquire services deemed to be for the public benefit. The PSO structure is appropriate for Kazakhstan. Local communities should contract with KTZ (or other railway operators that may evolve as the railway is reformed) for specific commuter services. PSOs typically contain both financial and operating performance standards and can specify fare levels the public will pay as well as who collects passenger revenues. PSOs will require new capabilities on the part of government units and railways. New capabilities required by government units include the ability to write contracts, monitor performance (financial and operating), make and collect payments, and adjudicate and resolve disputes. In addition to these capabilities, railways must have the ability to account for costs associated with specific services and parts of the infrastructure.

2.6.3 KTZ Relationships with Other Governments

KTZ is a member of the CIS Railway council, an association of former Soviet railways that cooperate on tariffs, railway interchange agreements, and for the coordination of through freight and passenger services. These associations should continue and should be maintained at the level of the Railway enterprise (not at the level of individual railway enterprises that may continue to exist at railway divisions). KTZ should enter into commercial bi-lateral arrangements with neighboring railways to promote transit traffic and cooperation on common matters. Some neighboring railways are departments of national government ministries. KTZ should retain the right to negotiate with and enter into agreements with such agencies. Occasionally, a ministerial level agreement may be needed. For such purposes, KTZ should seek assistance from the MoTC and other government departments in Kazakhstan as necessary to conduct international agreements and provide transportation services. This does not appear to have been a problem in the past, although a dispute between the Russian government and KTZ on equipment rental charges and other cost sharing could escalate to the ministerial level.

2.8 Summary

KTZ has prepared an impressive series of plans and strategies for reform. However, there is no integrated analysis of the financial, operational and employment effects, or of the ultimate impacts of the restructuring, operations optimization, and investment programs. While the Restructuring Program makes allowance for the eventual privatization of some of the competitive elements of KTZ, the separation proposed is slower than KTZ itself thinks it can accomplish and fewer units are separated than are feasible. KTZ's operations optimization program is also slower and less aggressive than KTZ department heads believe possible. Finally, given the traffic reductions that have occurred since 1990 and the structural changes that should occur from the reform process, KTZ must have a significantly smaller investment program.

To evaluate the prospects for reform and to establish the parameters necessary to develop independent financing capabilities, an integrated analysis of the potential reform options, including restructuring, operations improvement and cost reduction and investment capacity was conducted. That integrated analysis includes a review of KTZ's markets and a market forecast, a review of cost reduction and restructuring options that may be available, and an analysis of the potential impact of these actions on KTZ's financial performance.

The integrated financial analysis indicates that KTZ restructuring, investment, and operations optimization programs are insufficient to ensure the financial viability of the railway network, even assuming that losses from passenger operations are eliminated. The following chapters describe this analysis and the potential financial performance KTZ can achieve.

III MARKET ANALYSIS AND MARKET FORECASTS

KTZ provides economically vital transportation services for both passengers and freight in Kazakhstan. KTZ passenger operations provide transport links between major domestic cities, within certain cities and internationally. KTZ freight operations serve the major heavy industries in Kazakhstan. These industries extract, refine and ship natural resource-based products such as coal, oil, copper and steel. Before the dissolution of the Soviet Union, Kazakhstan's economy was thoroughly integrated with the economies of other FSU countries, especially Russia. Power plants in the Urals region were designed to burn Ekibastuz coal. Aluminum refineries in Russia smelted Kazakhstan bauxite. Russian power plants supplied heat and electricity to northern Kazakhstan communities. Kazakhstan also linked Russia with the other Central Asian nations, and significant trade between them flowed over KTZ.

With the dissolution of the Soviet Union, Kazakhstan has started to develop broader trade links, especially with European nations and China. These will take time to develop with new trading partners, because they are built upon thousands of individual—and mostly private—investments. As an example, contemplated export of electricity from Kazakhstan to China will require investment in electric transmission lines between the two countries.[10] During 1997, Russia took 34 percent of Kazakhstan exports and CIS countries as a whole took 47 percent. By 2002, trade with CIS countries is expected to account for 27 percent of exports, while the remainder—primarily oil—is expected to be with "far abroad" countries.[11]

Since independence, Kazakhstan has privatized most major industries. Private capital—much of it from the West—has flowed into Kazakhstan industries. The private investors often bring a broader marketing perspective as well as investment in technology. Ispat Karmet, for example has expanded the countries that buy Kazakhstan steel to 60, with China taking a third of production.[12] Other firms are investing in both Kazakhstan and Russia, creating vertically integrated trans-border production companies. Such companies can be found in the electric power, aluminum processing and copper processing sectors.

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[10] AES indicated that it was exploring construction of an electric transmission line between Ekibastuz or Semipalatinsk and China. A protocol was recently signed between China and Kazakhstan to permit a transmission line to be built. Interview with John Abbas, Commercial and Business Director and Igor V Sergeyev, Project Director and Legal Officer, AES Ekibastuz LLP (17 Feb 99).

[11] PlanEcon, *Review and Outlook For the Former Soviet Republics* (October 1998) p. 134.

[12] Interview with R N Thakur, General Manager of Transport & Services, Ispat Karmet and Y P Kumar, General Manager of Marketing, Ispat Karmet (February 18, 1999).

3.1 Market Setting

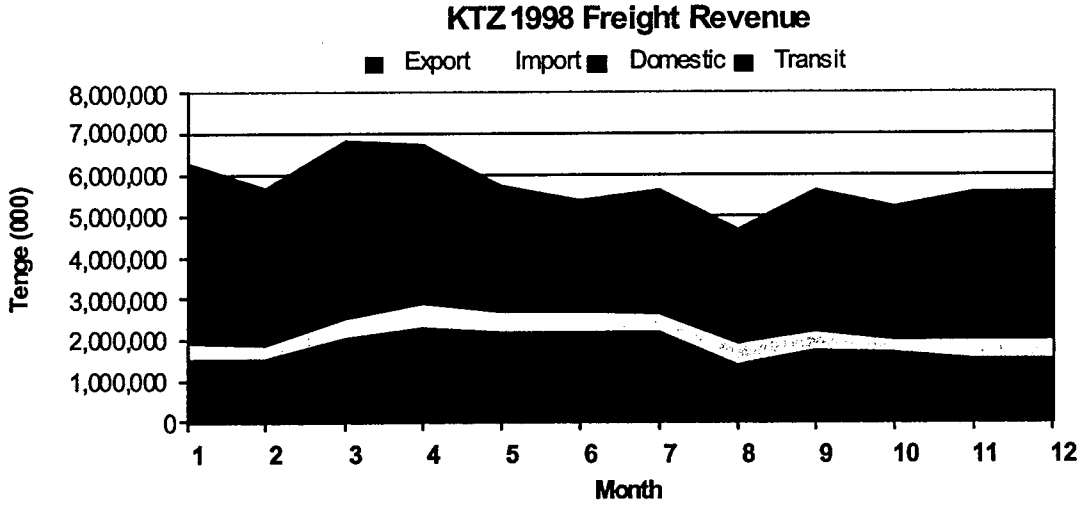
KTZ's core transport business provides nearly 90 percent of its overall revenues. As KTZ divests non-core businesses and railway supply businesses the transport component is likely to rise to nearly 100 percent.

KTZ Operational Revenue (Tenge, millions)

	1997 Revenue	1997 Share	Estimated 1998 Revenue	1998 Share
Transport				
Freight	70,819	78%	70,763	75%
Passenger	9,785	11%	10,760	11%
Total	80,604	89%	81,523	87%
Accessory Works	9,749	11%	13,100	14%
Total KTZ	90,354	100%	94,623	100%

Source: KTZ Financial Statements, 1998 based on 11 months annualized for passenger & freight; 9 months annualized for other.

In recent years, freight services have provided about three-quarters of KTZ's revenue, while passenger services have produced 11 percent. The 1998 figures are based on annualizing the first eleven months results for freight and passenger revenue and three-quarters' results for other revenue. Preliminary traffic reports indicate that traffic declined in the forth quarter.[13] In addition, tariff discounts dictated by the Anti-Monopoly Committee were implemented in August 1999. These discounts reduced KTZ's revenue by an estimated 828 million Tenge in 1998.[14]



In the short term, KTZ traffic and revenue are likely to decline. The full impact of the Russian economic crisis has yet to be felt throughout the Kazakhstan economy, but will certainly be reflected in KTZ traffic levels. Thus, additional declines in freight business can be expected in 1999. In addition, the tariff discounts implemented in August 1998 will substantially reduce yield on certain traffic segments. The graph above—KTZ 1998 Freight Rvenue by month—shows that

[13] Operational traffic reports suggested that traffic might be down as much as 25 percent. Such a decline was not apparent in other data provided by KTZ.

[14] Interview with Zubaida Aspaeva, Head of KTZ Tariff Department.

KTZ revenues declined from a March/April peak to a low in August (the month the Russian ruble was devaluated and rate decreases were imposed). Traffic—particularly domestic traffic—recovered smartly in the forth quarter, but rate decreases held revenue below six billion Tenge per month.

The consulting team developed long-term traffic and revenue forecasts for both the passenger and freight businesses. For each market segment, we attempted to understand and reflect the underlying demand for transport service, the impacts of transport and source competition, and the effects of price changes. We also considered the structural changes included in the KTZ restructuring program. Key among these is the plan to privatize the provision of passenger services. When this occurs, passengers and communities together will be required to pay the full cost of providing passenger service. This is likely to significantly depress the quantity of service demanded. Private operators, moreover, not KTZ, are expected to provide these services. After 2000, KTZ is forecast to handle no passenger traffic.

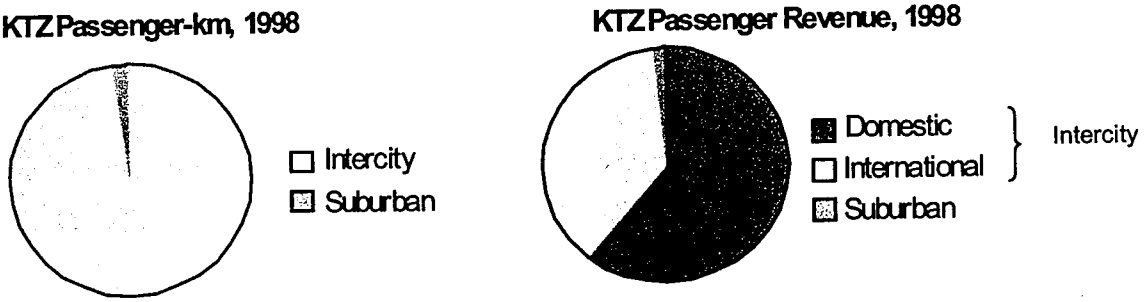
KTZ Traffic & Revenue[15] Forecast: Restructuring & Investment Plan

	1998	1999	2000	2005	2015
Passenger-km (millions)	10,657	10,480	10,551	none	none
Freight TKM	122,604	116,247	120,287	139,027	179,376
Passenger Revenue (Tenge, millions)	10,760	10,678	11,210	none	none
Freight Revenue (Tenge, millions)	70,763	65,531	66,049	74,017	94,761

Even so, transfer of responsibility for passenger service will not guarantee and end to cross-subsidies from KTZ's freight business. Government may set prices for KTZ provided services at levels below KTZ costs, paying only for incremental costs for example. KTZ will have to have a robust and defensible cost accounting and traffic costing system to understand how it should price and to defend price structures. In the financial analysis that follows, we have assumed compensatory pricing (KTZ receives revenues equal to it's costs) based on average costs. KTZ revenue from passenger track access and service charges runs about Tenge 2,000 million per year after 2001.

3.2 Passenger Business

KTZ's passenger business is composed of two major segments, suburban service and intercity service, with intercity split between domestic and international routes. As shown in the charts below, suburban service provides just 1.5 percent of KTZ passenger revenue and 2.1 percent of its passenger-km. KTZ believes that this service accounts for a more substantial portion of its costs. Domestic intercity passengers provide 61 percent of KTZ's passenger revenue, while international makes up to balance (38.5 percent).



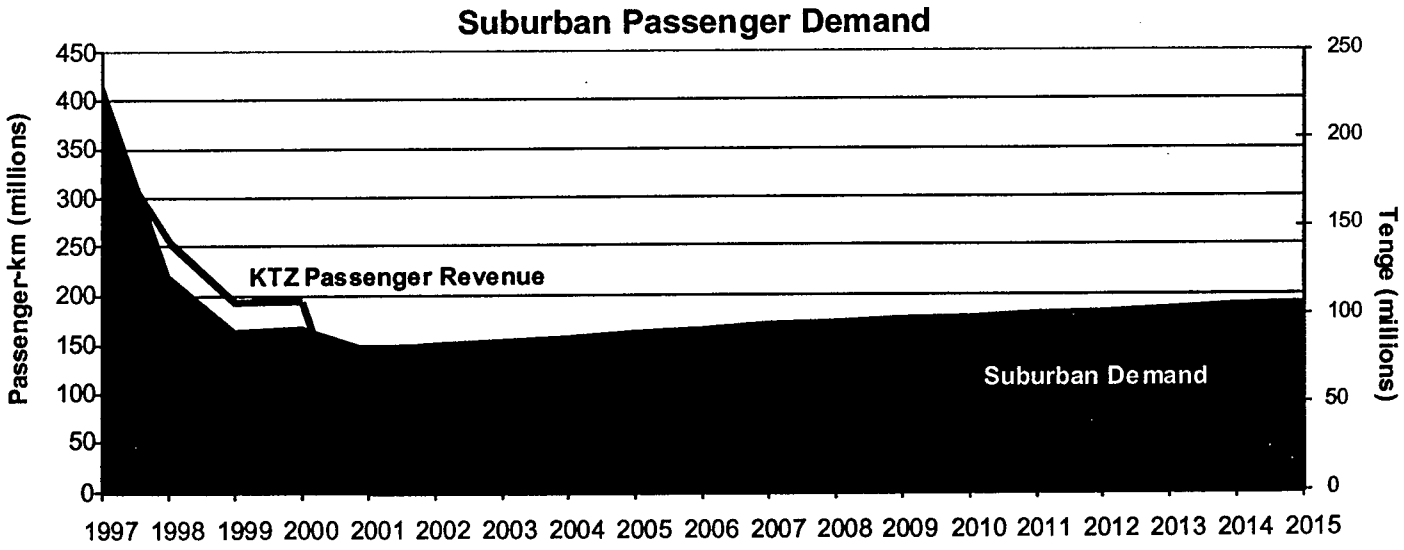
[15] To permit comparison, all revenue figures are shown in real 1998 Tenge.

3.2.1 Suburban Service

KTZ provides suburban service in all regional centers in Kazakhstan. The highest volume services are in Ekibastuz and Karaganda. The government of Kazakhstan tightly controls fares for suburban service, and KTZ estimates that fares cover about half the cost of providing service. While the government does not precisely specify the suburban services KTZ must provide, complete elimination of suburban services would be politically unpopular and KTZ does not believe its government owner would permit such action. KTZ has attempted to reduce the losses on suburban service by providing "minimum" service in each community, and suburban passenger-km were nearly halved between 1997 and 1998. KTZ faces stiff competition from bus services, which have already been privatized, for the suburban market.

KTZ has separated the passenger activities into a separate SSE. Ultimately, KTZ plans to privatize the provision of suburban passenger services to one or possibly several private companies. As private companies, these firms will only provide services on which they can make a profit. Consequently suburban passenger fares are likely to rise. Local communities—which currently provide no support for suburban service—will have to subsidize socially desirable services. When pressed to assume responsibility for the cost of commuter services, local communities may well find that transport requirements can be reduced or met more cheaply with buses. This is especially likely to occur in lower density markets.

The traffic forecast anticipates that KTZ will continue to eliminate suburban train service in 1999, reducing passenger-km by 25 percent. Privatization of the passenger unit will occur by 2001, and new operators will attempt to increase farebox recovery by raising rates 50 percent. This will dampen traffic demand by 13 percent. Following this restructuring, demand is expected to increase with the industrial GDP of Kazakhstan. After privatization of the passenger SSE, KTZ will not provide suburban train services but will continue to provide track access for other passenger service operators.



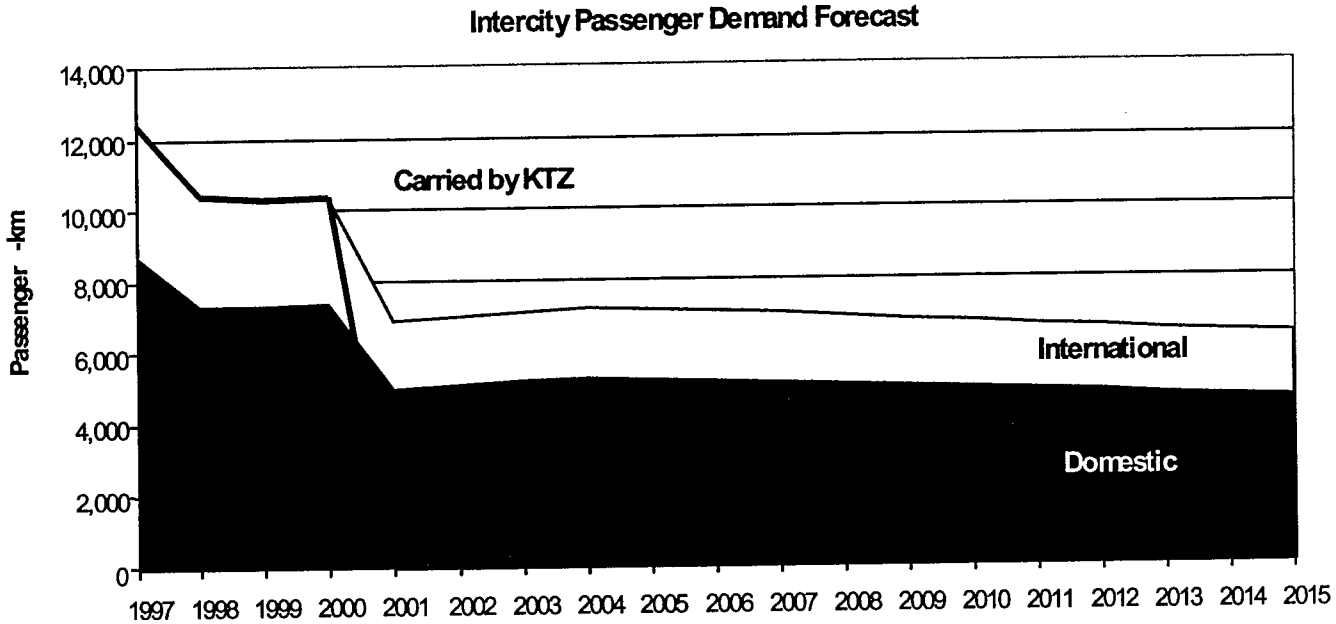
3.2.2 Intercity Services

Intercity services are offered domestically between regional centers in Kazakhstan, and between Kazakhstan regional centers and cities in neighboring countries (e.g., Moscow, Tashkent). The

customer profiles for domestic and international services are similar. KTZ serves mostly middle to lower income customers. Its market mix currently is:

- 40 percent shuttle traders
- 30 percent business travelers
- 20 percent pleasure travelers
- 10 percent students, retirees, soldiers and others with special traveling privileges.

KTZ's intercity services face competition that is currently limited, but is expected to increase over time. Travelers with high incomes prefer air service. Such a large price and service difference[16] exists between rail and air, however, that they compete for a very limited number of customers. Bus and private auto are potential competitors but do not currently pose a strong threat. The road network in Kazakhstan is in poor condition and often impassable during the winter. As the government of Kazakhstan improves the road network, bus competition is expected to grow.



As Kazakhstan's economy recovers, domestic demand for intercity travel services is expected to increase. Countering that trend for rail is increased competition from bus and air. Overall, we expect demand for rail service to grow at half the rate of GDP, with loss of market share after 2004, as roads are improved.

Domestic passenger fares are collected in cash and denominated in Tenge. Domestic fares are subject to strict government oversight. After privatization of passenger services, the government of Kazakhstan will have to allow fares to rise to compensatory levels or subsidize passenger services to attract operators. We forecast that the privatization of passenger services will occur in 2001, and that restructuring of routes, services offered and prices will result in a rate increase of 50 percent and traffic decrease of 32 percent.

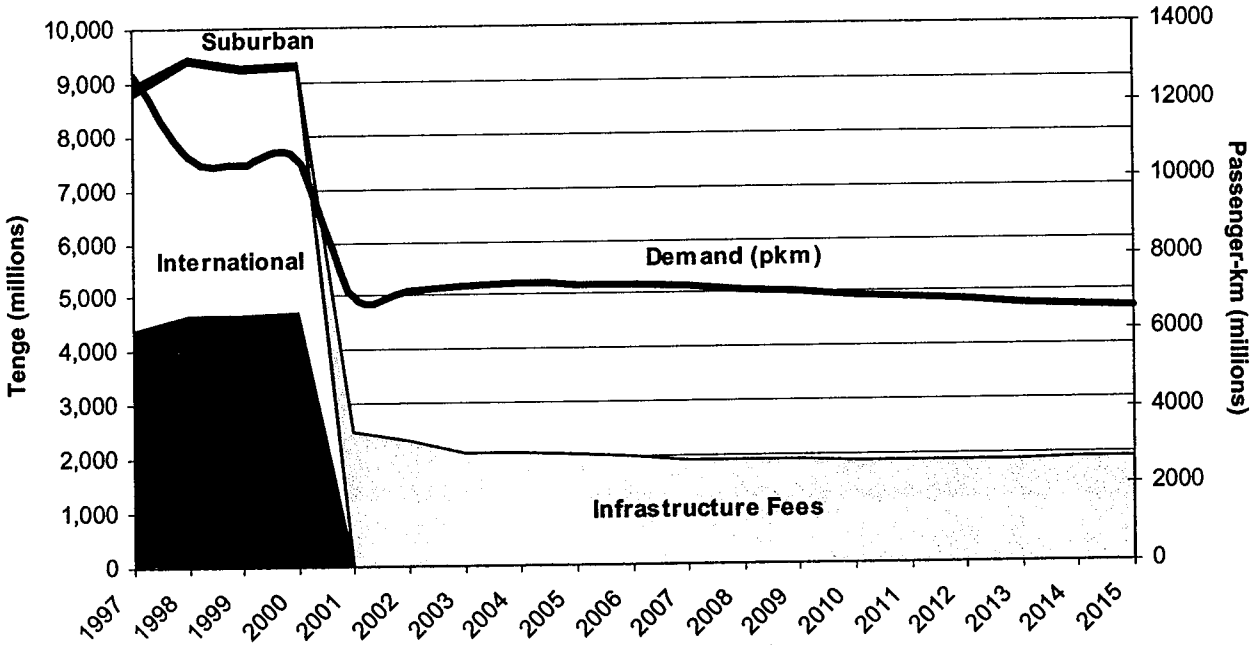
[16] The train between Astana and Almaty takes 23 hours, while the air trip takes two hours. At present, rail does have superior reliability.

Demand for international travel is expected to grow as a function of the economies of Kazakhstan and its neighbors. As with domestic intercity travel, rail will face growing competition from air, bus and private automobile. Consequently we expect underlying demand for intercity rail service to grow at half the rate of GDP (weighted between the GDP of Kazakhstan, Russia and Uzbekistan), and to experience a loss of market share to bus and air after 2004. International fares are collected in cash and denominated in Swiss Franks. They are established by agreement with other CIS railways. We forecast that the privatization of passenger services will occur in 2001, and that restructuring of routes, services offered and prices will result in a rate increase of 30 percent and traffic decrease of 38 percent.

3.2.3 Passenger Revenue Forecast

As shown in the graph below, overall KTZ passenger revenues (in real 1998 Tenge) are forecast to be 9 billion Tenge in 1999-2000. In 2001, when the Passenger SSE is privatized to one or

KTZ Passenger Revenue



more commercial companies, KTZ will be paid for use of the track infrastructure. These new companies are expected to operate their own crews, locomotives and coaches, and to pay KTZ their share of the cost of infrastructure.[17] The forecast of this revenue is based on the demand for passenger services as well as KTZ's cost of maintaining infrastructure. It is estimated at 2.5 billion Tenge in 2001, rapidly declining to just under 2 billion Tenge.

3.3 Freight Business

KTZ carries a broad mix of freight commodities, but with heavy concentration in a few commodities and for a few customers. As shown in the table below, coal is the largest segment, representing 30 percent of revenue and an even higher share of tonnes and tonne-km. Other

[17] This includes an allocation based on average cost for track, signaling, civil engineering works and electrification.

natural resource-based products—petroleum, ores and grains—account for an additional 29 percent of revenue. Heavy manufacturing, represented by iron and steel products, is now a relatively small portion of the mix (6 percent). Other agricultural and manufactured products represent 14 percent of tonnes, but 27 percent of revenue.

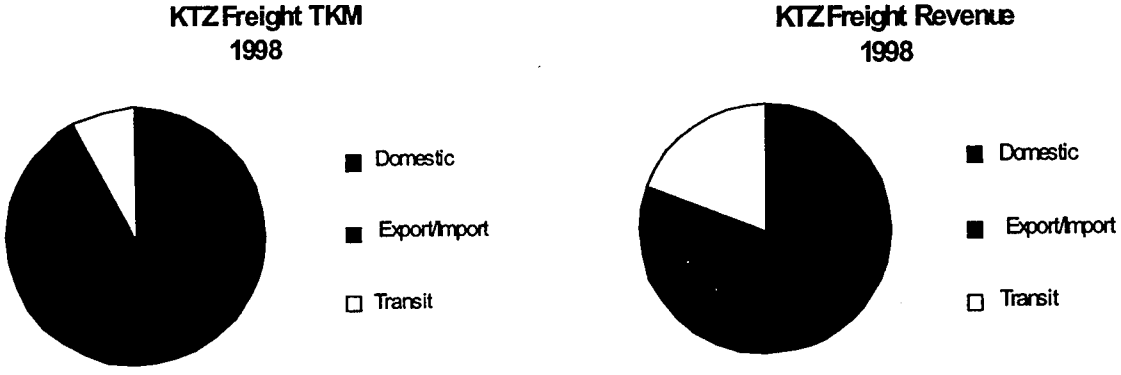
KTZ 1998 Freight Traffic and Revenue

	Revenue (Tenge, millions)	Revenue Share	Revenue Per TKM	TKM (millions)	TKM Share	Tonnes (thousands)	Tonnes Share
Coal	21,529	30%	0.43	49,814	41%	66,476	44%
Coke	460	1%	1.46	315	0%	986	1%
Petroleum Products	8,405	12%	0.58	14,388	12%	17,109	11%
Ores	6,482	9%	0.41	15,985	13%	22,132	15%
Iron & Steel Products	3,983	6%	0.68	5,820	5%	5,990	4%
Timber	1,430	2%	0.74	1,944	2%	1,272	1%
Construction Materials	3,258	5%	0.53	6,200	5%	8,763	6%
Mineral Fertilizers	641	1%	0.50	1,292	1%	1,521	1%
Grain	5,898	8%	0.85	6,928	6%	7,026	5%
Other	18,677	26%	0.94	19,918	16%	21,233	14%
Total	70,763	100%		122,604	100%	152,508	100%

Source: KTZ traffic data. Eleven months annualized.

KTZ's freight customer base is also very concentrated. Thirty-five clients generate approximately 85 percent of KTZ revenues. These clients are very dependent on KTZ to move their raw materials inbound and product outbound, and have few intermodal options. KTZ pricing and service have a significant impact on their cost structure. KTZ has significant market power vis-à-vis these customers. Similarly, these customers are so large that they have significant market power vis-à-vis KTZ.[18] KTZ needs them to be financially viable and competitive in international markets in order to have any business.

KTZ traffic can also be split between domestic movement, export/import movements and transit movements. As can be seen from the graphs below, export/import business generates over half KTZ's freight tkm, but under 40 percent of its revenue. Domestic shipments account for the largest portion of freight revenue (at 42 percent) and about 40 percent of tkm. Transit business, while less than 10 percent of tonnes, bears very high rates and provides 19 percent of freight revenue.



[18] KTZ is assigning service representative to these large customers, to understand their business requirements more fully and insure that the organization responds appropriately to them. This is valuable step in establishing a customer-based marketing organization.

3.3.1 Domestic & International Traffic Overview

KTZ faces little direct rail or intermodal competition for high volume transport movements within Kazakhstan. Highway transport in Kazakhstan is currently constrained by the vast size of the country and the light density/poor condition of the road network. As of 1993, the country's 2.7 million square km contained just 87,000 km of roads. Of these, 5,000-kilometers were unsurfaced and only 9,000-kilometers supported vehicles with 10 tonne axle loads. Truck and auto fleet sizes are also limited, although rapidly growing.

The main forms of competition to KTZ for both domestic and export/import traffic are product and geographic competition. Product competition stems from the ability of end users to substitute different products for the ones transported by the railway. This may occur, for example, if a power plant substitutes gas for Kazakhstan coal. Geographic competition comes from alternate suppliers served by different transporters providing the same product to the same end market as suppliers served by KTZ. Such competition is particularly strong for export business, where alternative sources of supply are ample and Kazakhstan products have less transport distance advantage. In addition to export movements, many of KTZ domestic movements are indirectly affected by this competition, as they are inputs to exported products.

Revenue Collections. After the dissolution of the former Soviet Union, KTZ experienced serious problems with collecting revenues from its domestic and export/import freight customers. Accounts receivable mounted and many accounts were paid in barter, rather than cash. KTZ has addressed this problem through measures such as requiring customers to prepay for transport and withholding service from customers that do not work down their outstanding accounts receivable. KTZ has a large balance of old accounts receivable, much of which has a low probability of being collected.[19] Uncollectible accounts for 1997 revenue, however, are about 3 percent of revenue.

Many customers remain unable to pay their bills in cash. KTZ has accommodated these customers by accepting some share of revenue in "offsets" or trades of account receivable. Rather than taking physical receipt of goods for onward sale—as it did early in the cash crisis—KTZ accepts accounts receivable of companies from which it wishes to buy goods/services. For example, KTZ trades claims on it (redeemed in transport) for claims on electric utilities or producers of railway materials. While this method of payment has resulted in large inventories of railroad goods, KTZ has largely eliminated the accumulation of useless goods, which occurred in the early days of barter transactions.[20]

Pricing. As recently as December 1996, KTZ rates for international transport were considerably higher than its rates for domestic transport. KTZ made a concerted effort to catch its rates up to inflation during 1997. In the process it narrowed the gap between international and domestic rates. With the longer average length of haul of international traffic, average revenue per tkm in 1998 for international traffic was about a third lower than the average revenue per tkm for domestic traffic.

Rail freight prices in Kazakhstan are contained in tariffs regulated by the Anti Monopoly Committee. The Kazakhstan tariffs derive from the tariff structure that prevailed within the Soviet

[19] As of October 1998, KTZ had 3.7 billion tenge in transport accounts over six months old. Over 3 billion of these stem from privatizations in which the government of Kazakhstan sold/concessioned companies free of their debts to KTZ.

[20] Information provided by KTZ on 1998 clearing of accounts through offsets.

Union before its dissolution. These formulas relate tariffs to railway costs, applying factors for shipment weight, distance and other characteristics. The formulas have been updated so many times, however, that the link to costs is quite tenuous. KTZ had been adjusting the tariffs quarterly for inflation. Since the second quarter of 1998, KTZ management has not increased prices, because of the adverse impact this would have on customers' sales.

In 1997, only four percent of freight revenue derived from negotiated rates. As discussed later in this chapter, KTZ needs to rapidly increase this percentage. If a tariff discount is given, it must be approved by the Anti-Monopoly Committee.

In mid-1998, the Anti-Monopoly Committee decided that KTZ should give customers discounts to help the economy and increase railway traffic. A committee was formed to study the discount issue "taking into account the export orientation of industries and to increase railroad traffic."[21] The committee included KTZ, the Ministry of Transport and the Anti-Monopoly Committee. The Anti-Monopoly Committee and ministry were solely interested in the amount and type of the discount. KTZ was able to intervene to attach conditions to the discounts that would benefit the railway. The discounts granted were:

- 25% for coal, if prepaid in cash;
- 15% for phosphorus to Russia, if prepaid in cash and outstanding accounts receivable settled;
- 30% for fertilizers to China, if prepaid in cash and outstanding accounts receivable settled;
- 50% for phosphorus raw materials if volume exceeds 1 million tonnes;
- 30% for coal from Ispat Karmet (Karaganda) to Russia, if volume exceeds 1.5 million;
- 50% for mineral waste from Ispat Karmet;
- 30% for copper for Balkhash Mining to keep the production facility open;
- 25% for non-ferrous ore from aluminum mining facilities;
- 25% for Urasian Bank Companies for imported raw material and exported finished products;
- 30% for sulfuric acid if volume exceeds 250,000 tonnes.

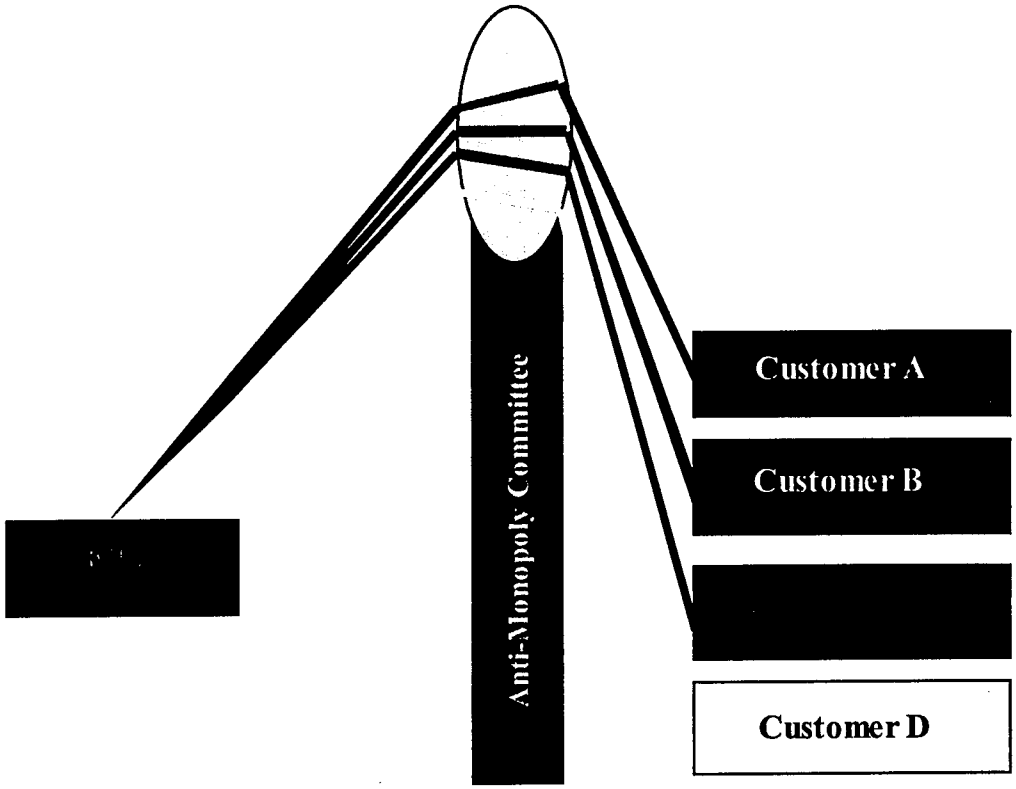
KTZ has been able to limit the provision of discounts for cash to customers that actually pay in cash. It has not been able to enforce the volume minimums associated with volume discounts.

These tariff discounts highlight a serious marketing problem for KTZ. Railway pricing issues are being resolved by KTZ and railway customers talking to the Anti Monopoly Committee, rather than to each other. Such a process results in prices that are, at best, crudely related to the market situation of the customers, the cost of providing the service and the needs of the railway. At worst, the customer who cries the loudest and most convincingly to the government is arbitrarily awarded the best price, in complete ignorance of the cost.

This indirect process allows many customers (there are more customers than railroads) to focus their attention on a single government agency and concentrate their combined pressures on a political agency. This agency has no established economic standards or a legal framework on which to resolve rate disputes, so decisions are necessarily political. KTZ must develop detailed and credible cost data on which it can support an its positions on rail pricing matters. It must also

[21] Interview with Zubaida Aspaeva, Head of KTZ Tariff Department.

work to teach the Anti-monopoly committee basic information about rail costs, long term variable costs, capital cost allocations and similar concepts.



Further, when rates are set in a political forum, KTZ loses the commercial opportunity to develop pricing agreements that are mutually beneficial to the railway and the customer. KTZ needs to seize the initiative on prices away from the government and establishing direct communication with customers on price. Pricing should become a commercial exercise, not a political one.

KTZ currently has vast excess capacity and a shortage of cash. It needs to use prices and price discounts to:

- ***Attract new, profitable traffic to the railway*** through offering volume discounts tailored to the customer's market situation;

- ***Retain profitable traffic that might be lost to the railway*** by reducing KTZ's margin, if necessary (and effective) for keeping a customer competitive;

- ***Improve the cash collections of the railway*** through providing discounts for cash payment.

Such sophisticated pricing is predicated on an understanding of the railway's cost structure and an understanding of the profitability of each type of traffic, so that the profit implications of price changes can be measured. It also requires good research on the customers' markets, so the market impacts of pricing actions are well understood.

Service. KTZ's service level for major freight shippers appears to be adequate. Interviews with major shippers indicate that price, not service, is their primary concern. Common customer

concerns, such as reliability and equipment supply were not raised. When service concerns were aired, they appeared to be intertwined with price issues. For example:

- Once customer discussed a problem with weighing wagons that had caused overweight wagons to be returned frequently. This was resolved by changing the rate structure to charge for the overloading (within operationally workable margins) rather than return the wagons, delaying the shipment and charging the customer twice for each wagon.

- KTZ's requires customers to predict their traffic levels a month and a half in advance, and charges a significant premium for any deviation from the forecast. Customers, now selling in a market environment, find that they can no longer predict their traffic so long in advance and accurately enough to meet KTZ's requirements.

KTZ's interface with customers is very poor. Large shippers cope by having full time staff to navigate the bureaucratic maze. Small customers hire a freight forwarder or ship by truck. KTZ loses potential margin—or the traffic altogether—as a consequence. As discussed in section 3.4.2, fifteen percent of KTZ's freight revenue comes from consumer business, where shippers are smaller and less concentrated. IF KTZ wishes to retain this business, it must show these customers a friendlier face.

3.3.2 Coal

In 1998, coal represented 44 percent of the tonnes loaded on KTZ, 41percent of its tonne-kilometers and 31 percent of its revenue. Coal traffic is down considerably from its 1990 level of 123 million tonnes, but at 66 million tonnes, coal remains KTZ largest business segment.

1998 Coal Traffic & Revenue (excludes transit)

	Revenue (Tenge, millions)	Share of Revenue	Revenue per TKM	TKM (millions)	Share of TKM	Tonnes (thousands)	Share of Tonnes
Domestic	11,758	56%	0.57	20,751	42%	36,924	56%
International	9,351	44%	0.33	28,750	58%	29,366	44%
Total	21,109	100%	0.43	49,501	100%	66,291	100%

Source: KTZ traffic data. Eleven months annualized.

As shown in the table above, KTZ carried 66.3 million tonnes of coal in 1998. Of this, 56 percent was for domestic shipment and 44 percent international shipments. International movements have longer average haul than domestic, causing them to account for 58 percent of tonne-km. KTZ's revenue per tonne-km is significantly lower for international movements. As a result, KTZ revenue for these moves makes up 44 percent of the total.

The two major originating points for coal are Ekibastuz and Karaganda. The pits at Ekibastuz are some of the lowest cost coal producers in the former Soviet Republics, with sizable reserves (4.6 billion tonnes). Ekibastuz coal however, has a low heat content (3,000-4,700 kcal/kg) and very high ash content (up to 45 percent). The rights to mine the Ekibastuz coal deposit are split between three firms.

- ***Bogatyr Access Komir.*** Bogatyr is a subsidiary of Access Industries, which also owns energy generation capacity in Kazakhstan, including the Petropavlovsk TETS-2 heating and electrical

plant, the Pavlodar heating and power plant, the GRES-2 power plant in Ekibastuz and the North Kazakhstani Energy Grid Company (OJSC).[22] Design capacity of the mine is 70 million tonnes, while actual production was 21.4 tonnes in 1997 and 21.5 million tonnes in 1998. Bogatyr's major customers are a Kazakh energy firm, three Kazakh power plants, a Russian aluminum smelter owned by Access, and three Russian power plants in the Urals region.

- ***Vostochny***. Vostochny is affiliated with Urasian Bank, which has interests in mining and industrial production in many sectors of the Kazakhstan economy. The Vostochny mine delivers coal to the Aksu Ferro Alloy plant and to domestic utilities. Much of Vostochny production is delivered to Vostochny-owned power plants, so the Vostochny mine pays very little VAT tax. Vostochny uses US conveyor technology, which reduces its costs below Bogatyr's cost and makes it more competitive in the market. Vostochny is also able to blends coal to obtain higher quality. Vostochny produced an estimated 11 million tonnes in 1998.[23] Of all the mines in Kazakhstan, it alone is paying KTZ in cash and receiving a 25% discount on transport rates. KTZ reported that it was restricting car supply to encourage Vostochny to pay down its outstanding accounts receivables.

- ***Severny***. The Severny Mine was transferred to Unified Energy Systems of Russia in late 1996 to offset Kazakhstan debts for Russian electricity. It produced an estimated 11.7 million tonnes in 1997 and 15 million tonnes in 1998.[24] Severny supplies domestic utilities and power stations in Russia.

Karaganda is also an extensive mining complex, with large reserves (9.4 billion tonnes), some 26 mines and 8 concentration mills. The Karaganda coal is of higher quality than the Ekibastuz coal, but mine operations are significantly more expensive. Four mines are currently operating in Karaganda.

- ***Ispat Karmet***. Ispat Karmet produces coal for its own consumption in steel-making. Formerly, it also exported coal to Russia for electric power production (1.8 million tonnes in 1996, 1.3 million tonnes in 1997, 0.5 million tonnes in 1998). Ispat contends that it lost the Russian markets because the Russian railway gave Russian producers a larger discount than KTZ would offer to Ispat.[25]

- ***KaragandaUgol***. This firm mined an estimated 4 million tonnes in 1998. Its primary customers are copper mining and processing facilities.

- ***Samsung***. The Samsung mine produced an estimated 4 million tonnes in 1998. Samsung controls Kazakhmys, a holding company containing copper mining and electric power production facilities.

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[22] Access Industries also involved in oil production and refining in Russia (Tyumen Oil Company) and is the third largest aluminum producer in the world.

[23] Estimate provided by Bogatyr Access Komir. KTZ car loading statistics for 1998 suggest a figure closer to 15 million tonnes.

[24] Estimate provided by Bogatyr Access Komir. KTZ car loading statistics for 1998 suggest a figure closer to 11 million tonnes.

[25] Interview with Interview R N Thakur, General Manager of Transport & Services, Ispat Karmet and Y P Kumar, General Manager of Marketing, Ispat Karmet (18 February 1999). No information was provided on the Russian Railways revenue division for the Kazakhstan-Russia transport movement. Other price information shows that the Russian Railway charges are significantly higher per tkm that KTZ's, and suggest that they may be attempting to favor Russian producers and Russian Railway long-haul movements.

- ***Shubarkul.*** This mine produced an estimated 500,000 tonnes in 1998.

Two smaller mines also operate in the region.

- ***Maikubene West.*** This mine produced an estimated 2.5 million tonnes in 1998. It supplies a single municipal utility.
- ***Semi Komerdery.*** Semi produced an estimated 1.5 million tonnes in 1998. It supplies an electric utility in Semipalatinsk.

KTZ carried nearly all of the production of these mines.[26]

Competition. As shown in the table below, the Kazakhstan coal industry sells about 30 percent of its output to utilities and industries in Russia and the remainder to utilities, industries and households in Kazakhstan. The Kazakhstan producers face some source competition from Russian-produced coal. Mines in the Urals produce coal, but the deposits are small and not adequate to supply the power generation requirements of the region. Mines in the Kuzbass region are trying to gain some of the Urals market. They are considerably more distant from the consumer than Ekibastuz.

Markets for Kazakhstan Coal

	1998	1999
Kazakhstan		
Utility/industry	35.0	33.5
Household	10.5	10.0
Total	45.5	43.5
Russia		
Utility/industry	20.0	19.0
Total	65.5	62.5

Source: Bogatyr Access Industries.

The coal producers are also mindful of the possibility that their electric utility customers could convert to gas, which is both plentiful and inexpensive in the region. This would require investment funds, which are currently very scarce. Consequently, conversion is thought to be a long-term, but not a short-term competitive threat.

Pricing. Realized transport rates for coal have increased substantially since 1996. Bogatyr reports that it enjoyed a 50 percent discount off the tariff rate in 1996. Tariffs were increase 70 percent in 1997 and the discount was eliminated, effectively tripling rates. Currently, transport accounts for 30 to 75 percent of the delivered cost of coal for domestic coal, depending on the length of haul. On moves to Russia, transport is about 75 percent of the delivered cost. KTZ rates on international movements are 30 to 60 percent lower per tonne-km than the Russian Railway rates.

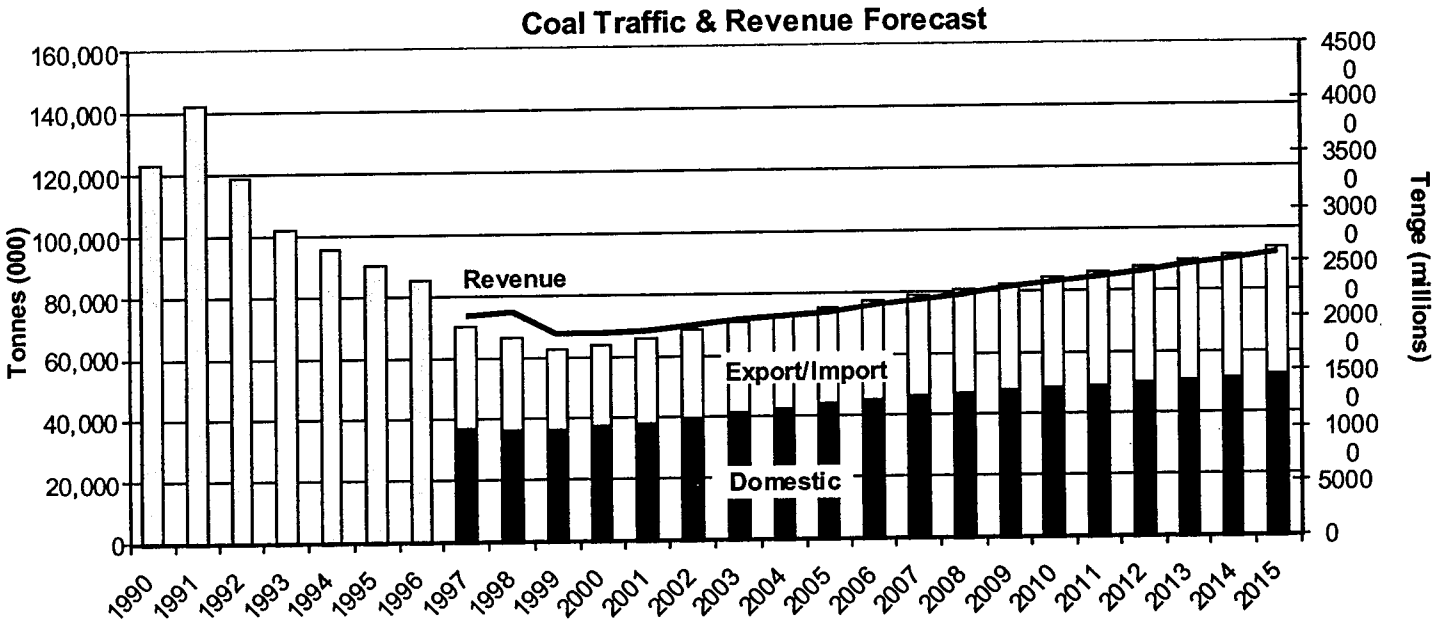
Revenue Collections. KTZ and its predecessor railways have experienced enormous problems collecting revenues from their coal customers. In 1996, the Karaganda coal and steel production facilities were privatized and sold to Ispat-Karmet. In late 1996/early 1997, the Ekibastuz coal mines were privatized and sold. While these sales resulted in the Kazakhstan government forgiving huge accounts receivable owed to the railways, current collections from the private

[26] A small amount of coal used for domestic heating is delivered by truck.

operators were expected to improve. The changes have indeed improved KTZ's collections experience with these customers.

The coal mines' customers, however, are also problem payers and the mines are not able to pay their bills completely in cash. Bogatyr, for example, reports that most of its sales to domestic utilities are paid in offsets. Sales to an affiliated aluminum company in Russia provide Bogatyr enough cash to keep afloat. This situation appears representative of most of the industry. At present, KTZ is insisting that 30% of the freight bill be paid in cash and the remainder through offsets. KTZ offers a 25 percent discount for any coal shipper than prepays in cash. Only Vostochny has been able to take advantage of the discount.

Traffic and Revenue Forecast. Domestic coal movements generate over half of KTZ's coal revenue in 1998. Domestic coal traffic is shipped from Ekibastuz and Karaganda to electric utilities and industrial users in Kazakhstan. The electric power industry in Kazakhstan has been restructured and privatized, and electricity production has dropped as the newly-private firms stopped providing service to non-paying customers. Economic retrenchment, losses of population, and a relatively mild winter also reduced demand in 1998. This has left ample excess capacity at existing coal-fired power plants. As the economy of Kazakhstan recovers, therefore, we expect the expansion to be fully reflected in demand for electricity and the resulting demand for coal. Domestic coal volume is forecast to drop slightly in 1999[27] and recover in subsequent years, resulting in traffic of 37.8 million tonnes in 2000 and 44.3 million tonnes by 2005.



Although transport rates are a significant share of the delivered price of coal to utilities and businesses in Kazakhstan, load shifting in Kazakhstan is not well enough developed to expect a strong demand response to transport price changes. Therefore, we estimate the price elasticity of demand at 0.3 for this traffic.

Export/import traffic accounts for 44 percent of KTZ's coal revenue. The bulk of this business is coal for electric utilities and industries in Russia. With economic crisis in Russia, demand is

[27] Based on forecasted slow down in the economy of Kazakhstan and validated against a forecast provided by Bogatyr Access Industries.

expected to drop 14 percent in 1999. In the longer term, demand for this business is expected to change as a function of the industrial GDP of Russia and increasingly with the industrial GPD of China. This brings export traffic back to 29 million tonnes by 2003. Although export coal demand is price inelastic, export traffic is likely to be more price sensitive than domestic traffic, as utilities have more options for coal supply. The price elasticity of demand is estimated at 0.5 for this traffic.

Prices for coal business are not expected to change in real terms during the forecast period. However, as customers become more able to pay in cash, they will increasingly be able to qualify for the 25 percent discount. Overall revenue from coal business is expected to decline sharply in 1999, but recover in subsequent years. The share paid in offsets is expected to decrease from 75 percent to 30 percent for domestic traffic and from 50 percent to 20 percent for export/import business.

3.3.3 Petroleum Products

In 1998, petroleum products represent about 11 percent of the tonnes loaded on KTZ and 12 percent of its tonne-kilometers and revenue. In 1990, the Kazakhstan railways originated 25.6 million tonnes of petroleum traffic. This consisted primarily of processed petroleum products from Kazakhstan's three refineries. Petroleum traffic dropped to 14.7 million tonnes in 1993. With the development of the Tengiz Oil field, KTZ gained new business carry crude for Tengizchevroil. Petroleum business rebounded to 21.2 million tonnes in 1995 and 20 million tonnes in 1996. First half 1997 traffic was 13% ahead of 1996's pace, but the year ended down eight percent.

1998 Oil Traffic & Revenue (excludes transit)

	Revenue (Tenge, millions)	Share of Revenue	Revenue per TKM	TKM (millions)	Share of TKM	Tonnes (thousands)	Share of Tonnes
Domestic	3,533	46%	0.61	5,793	42%	7,724	46%
International	4,156	54%	0.51	8,118	58%	9,090	54%
Total	7,689	100%	0.55	13,910	100%	16,814	100%

Source: KTZ traffic data. Eleven months annualized.

KTZ serves several major oil production companies and three oil refineries.

- ***Tengizchevroil.*** The largest oil extraction company in Kazakhstan, Tengizchevroil produced 8.3 million tonnes of oil from the Tengiz field in 1998.[28] It ships about two-thirds of its production by rail;[29] the remainder moves by pipeline. The Tengizchevroil production moves by rail to refineries in Kazakhstan, to Russia for export to world markets and to China. Tengizchevroil is currently loading about 50,000 tonnes a month to China, and this traffic is expected to increase. Overall, Tengizchevroil production is expected to increase to 9.3 million tonnes in 1999 and to 12 million tonnes by 2001. Production volume is likely to be very sensitive to the price of oil. Oil prices dropped to $10 per barrel in 1998 before climbing back to the $12 to $15 per barrel range. Oil prices are expected to continue to be volatile.

[28] "Chevron Sees Tengiz Oil Output Rising to 12 mln t/y," *Reuters Limited* (02/12/98).

[29] "Chevron Says Oil Transport from Tengiz Field Barely Profitable," *Bloomberg, L P.* (18/02/99). KTZ traffic data indicate that it moves only about 40 percent of the Tengizchevroil output.

- ***AktobeMunaiGas***. Located in the Aktobe region near Aktau, AktobeMunaiGas is the fourth largest oil company in Kazakhstan. It was privatized in June 1997, with a majority stake sold to the Chinese National Petroleum Corporation. A significant portion of production is exported by pipeline to Russia (Orsk refinery) and sold to domestic refineries. Exports to China by rail were expected to amount to a million tonnes in 1998.[30]

- ***EmbiMuniaGaz***. Located in Makat (northeast of Atrau), EmbiMunaiGaz shipped several hundred thousand tonnes by rail in 1998. KTZ indicates that this traffic is exported to Poland and Slovenia.[31]

- ***ShNOS (Chimkent Oil Refinery)***. The Chimkent Refinery has capacity to process 6-7 million tonnes per year. In 1998, it processed 3.65 million tonnes.[32] It is owned by a private consortium that includes Kazkommertzbank. The refinery's main source of crude, which it receives by pipeline, is Hurricane, a Canadian production and exploration firm. Its main customers are in southern Kazakhstan (about half are in Almaty) and Krygyzstan. The refinery ships to them by rail. The Chimkent refinery faces competition from Russian refineries, which have more reliable supplies of crude, and has attempted (unsuccessfully) to gain government protection against foreign competition.

- ***Atyrau Refinery***. Built in 1945, the refinery has capacity to process 4.5 million tonnes of crude per year. It is located in the Kazakhstan oil fields and uses local feedstocks. A Japanese firm, Marubeni is investing in the facility and promises to upgrade the production technology. In 1998, the Atyrau refinery's products proved uncompetitive and surplus stocks accumulated.[33] KTZ reports that the refinery exports its products to Italy via rail.[34]

- ***Pavlodar Refinery***. This refinery has the capacity to process 7.5 million tonnes of crude per year. Crude is supplied by pipeline from Russia. Production is sold domestically in Kazakhstan. In recent years, low domestic demand, combined with a shortage of crude has limited production to 1.7 million tonnes in 1997 and 2.4 in 1998. CCL Oil, a US company is operating the refinery under a three-year concession reached in March 1998.

Competition. KTZ faces competition for petroleum product transport from a number of sources. Crude oil is sold on world markets and must meet international competition. Chevron indicates that most of its Tengizchevroil production reaches market by rail, at a cost of $4 to $5 per barrel. This compares to "little more than $2 per barrel to produce." Given current low oil prices, Chevron indicates that "rail transportation is almost too expensive to justify continuing.[35]

Transport through existing pipelines cost $2 to $3 per barrel.[36] Numerous new pipeline schemes have been proposed, and one or more are likely to be built. Timing is uncertain, however. The Caspian Pipeline Consortium has announced plans to open a pipeline by 2001. With the world

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[30] Kazkommerts Securities, *Kazakhstan Equity Research, Aktobemunaigas* (May 1998) p. 6.
[31] Interview with Zhanara Sarsembekova, Head of Transport Planning Division (16/02/99).
[32] "Kazakhstan: Kazakh Chimkent Refinery Says 1998 Output Up," *Reuters New Service* (26/01/99).
[33] "Kazakhstan: Atyrau Refinery Cuts Output by Nearly 35%," *Strategic Business Information Database* (01/02/99).
[34] Interview with Zhanara Sarsembekova, Head of Transport Planning Division (16/02/99).
[35] "Chevron Says Oil Transport from Tengiz Field Barely Profitable," *Bloomberg, L P.* (18/02/99).
[36] *Ibid.*

awash in cheap oil, however, such heavy new investments in the Tengiz Oil fields may well be curtailed. A pipeline to China is also contemplated. The Chinese National Petroleum Company "plans to build a $3.5 billion link across 3,000km (1875 miles) to its Western Xinjiang province, giving Kazakhstan access to Asian markets."[37] This plan has no firm timeframe and awaits the development of a market sufficiently large to justify a $3.5 billion investment.

Pricing. KTZ tariffs for petroleum products are currently about average among all the commodities KTZ carries. Similar to the earlier discounts imposed by the Anti-Monopoly Committee, the Ministry of Energy, Industry and Trade is proposing tariff reductions that they claim "will lead to increases in the amount of oil shipped to refineries in Kazakhstan and for export."[38] The discount schedule proposed is shown in the table below.

Volume (tonnes)	Discount
0 – 500,000	5%
over 500,000 – 1,500,000	10%
over 1,500,000 – 2,500,000	15%
over 2,500,000 – 3,500,000	20%
Over 3,500,000	25%

As with the August 1998 discounts, KTZ appears to have lost the initiative in pricing actions and must now react to this pricing proposal.

Revenue Collections. Specific information was not provided on revenue collections experience with petroleum products customers. Tengizchevroil is believed to pay KTZ entirely in cash. Some 8.4 billion tenge was paid in oil offsets. Probably, much but not all of this was in payment for movement of refined product.

Traffic and Revenue Forecast. Domestic traffic accounts for over 40 percent of KTZ's petroleum revenue. This traffic consists of refined products moving from domestic refineries to consumption sites. As the economy of Kazakhstan grows, we expect the expansion to be fully reflected in demand for petroleum products. Demand for petroleum is forecast to increase slightly faster than industrial GDP. With no changes in price, this would result in traffic of 7.8 million tonnes in 2000 and 9.1 million tonnes by 2005.

Because domestic transport and source competition options for petroleum products are limited and transport is only a portion of the delivered price of the product, we estimate the price elasticity of demand is 0.3 for this traffic.

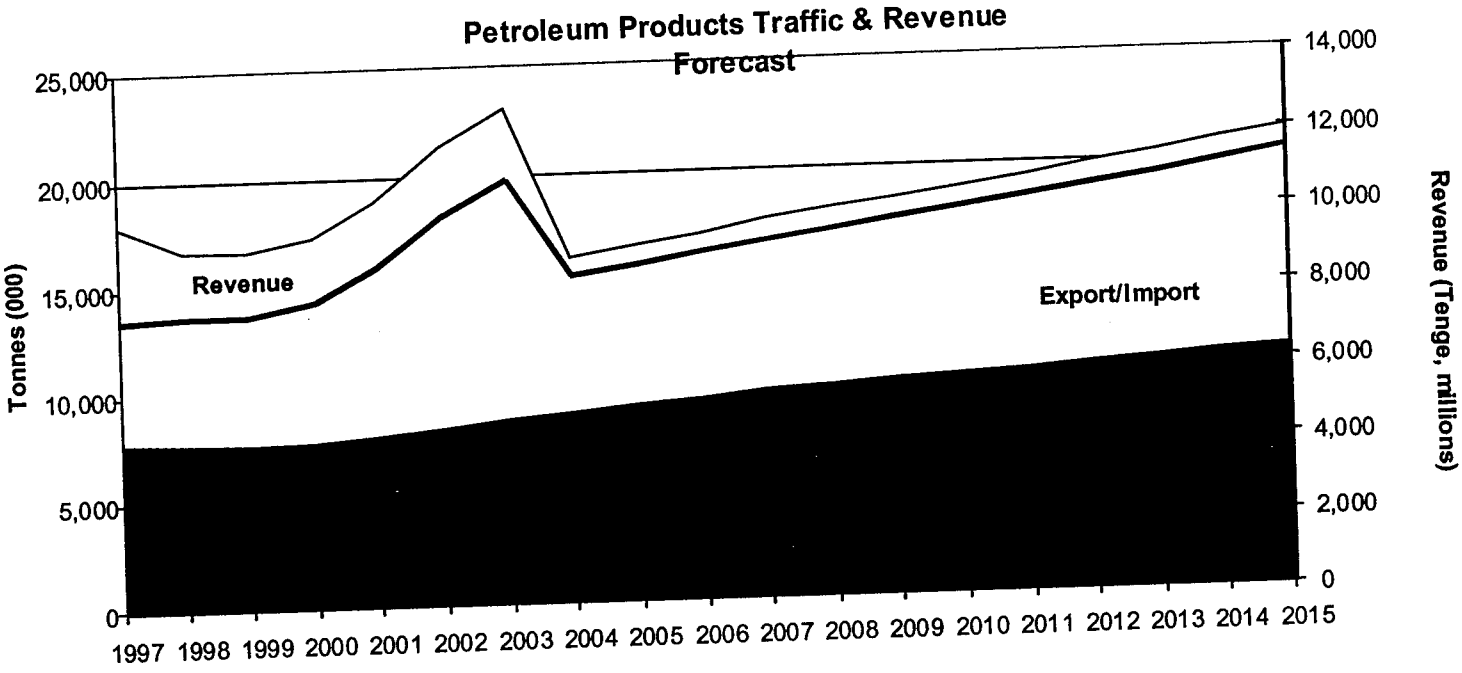
International traffic generates 58 percent of KTZ's petroleum revenue. The largest segment of this business is Tengizchevroil traffic. Some refined product is also exported. Demand for this product is driven by the international demand and price for oil. Chevron has stated that it plans to increase annual output to 12 million tonnes by mid-2000.[39] This will, however, be driven by world prices for oil and the ability to reduce production costs—including transport—for Tengiz oil. Numerous

[37] "Kazakhstan: Kazakhstan Eyes Mid-East Asian Oil Export Routes," *Reuters News Service* (26/08/97).
[38] "Kazakhstan Proposes Rail Tariffs On Oil Shipments," *Interfax Central Asia Report* (12/03/99).
[39] RFE/RL Newsline, 29 Dec 98.

alternative transport routes are being explored and developed,[40] and larger pipeline development is expected, if prices rise or production costs are significantly reduced.

We expect that world oil prices will stay relatively low in the medium term and that oil transport demand will increase, starting in 2000 because of growth in oil trade with China. By 2005, we expect an oil pipeline to be built to export Caspian oil. At that point, demand for KTZ services will be reduced but not eliminated, as Tengizchevroil will want to maintain viable transport alternatives to the pipeline and China trade is expected to continue growing.[41]

Although export oil demand is price inelastic, export traffic is likely to be more price sensitive than domestic traffic, as the product is being sold on very competitive world markets. The price elasticity of demand is estimated at 0.75 for this traffic.



Overall revenue from petroleum business is expected to decline slightly in 1999. In 2001-2003 economic expansion in Kazakhstan and expanded oil production in the Tengiz will fuel significant growth. Opening of an export pipeline (forecast for 2004) will drop export traffic, but domestic traffic will continue to expand with the economy and exports to China will continue to grow.

3.3.4 Ores

In 1998, ore business represented about 15 percent of the tonnes loaded on KTZ, 13 percent of its tonne-kilometers and 9 percent of its revenue. Ore traffic amounted to 31 million tonnes (14.6 billion tonne-kilometers) in 1995. Since then, it dropped to 23 million tonnes in 1996 and 22 million tonnes in 1997.

[40] For example, a new 2.5 million ton pipeline has been completed to carry Caspian region crude oil across Georgia to world markets. AP-NY-01-08-99.

[41] Tengizchevroil has arranged with Russky-Mir to lease oil tank wagons for 10 years.

1998 Ore Traffic & Revenue (excludes transit)

	Revenue (Tenge, millions)	Share of Revenue	Revenue per TKM	TKM (millions)	Share of TKM	Tonnes (thousands)	Share of Tonnes
Domestic	3,320	59%	0.42	7,944	52%	12,831	59%
International	2,303	41%	0.32	7,209	48%	8,900	41%
Total	5,623	100%	0.37	15,153	100%	21,731	100%

Source: KTZ traffic data. Eleven months annualized.

Of KTZ's top twenty customers measured by revenue and tonnes, a high proportion are ore shippers. As profiled below, these shippers extract a range of materials, which are sold into a variety of markets both domestically and internationally. While some are still in a restructuring phase, most have been sold to private interests that are investing in technological improvements and planning to expand output.

- ***SSGPO***. The Solkolov-Sarbai Mining Production Association is Kazakhstan's biggest producer of iron ore commodities. It transported about 6 million tonnes last year on KTZ and plans to transport approximately 9 million tonnes in 1999. Its main customers are in the South Urals.

- ***Kazakhstan Aluminum***. Located in Pavlodar, Kazakhstan Aluminum controls the bauxite and alumina industries in Kazakhstan. The firm produces about 1.1 million tonnes per year, and moves about 3.5 million (inputs and outputs) by KTZ. The aluminum oxide is sold to Russia, mostly to the Bratsk and Sayansk smelters. The firm had developed plans to increase production to 2 million tonnes per year to supply a new smelter to be located in Pavlodar and supply the Chinese market.[42] The plans have recently been put on hold because of the global economic slowdown.[43]

- ***Kazinc***. Kazinc was formed in December 1996 from three aging and financially troubled enterprises that produced lead and zinc in Ust-Kamenogorsk, Leninogorsk and Zyryanovsk. Estimated output for 1998 was 225,000 tonnes of zinc and 120,000 tonnes of lead. In total (inputs/outputs) Kazinc transported about 2 million tonnes on KTZ. Glencore International, a Swiss firm has purchased a controlling share of the firm (62.4 percent). It plans to invest $160 million to raise output of the Zyryanovsk mine from 550,000 tonnes to 1.5 million tonnes.[44]

- ***Donskoi***. KazChrome mines chrome ore at the Donskoi mine. Before the dissolution of the Soviet Union, the Donskoi mine produced at capacity and sold it on world markets. Now that it is in private hands, output is being limited to the requirements of the KazChrome processing plants. The mine's main domestic customers are the Aksu Ferroalloy works (Pavlodar) and the Aktyubinsk Ferroalloy and Chemical complex. Main foreign customers are ferroalloy plants in Serov and Chalyabinsk (Russia). The firm expects to boost production about 40 percent next year to 2.2 million tonnes.[45]

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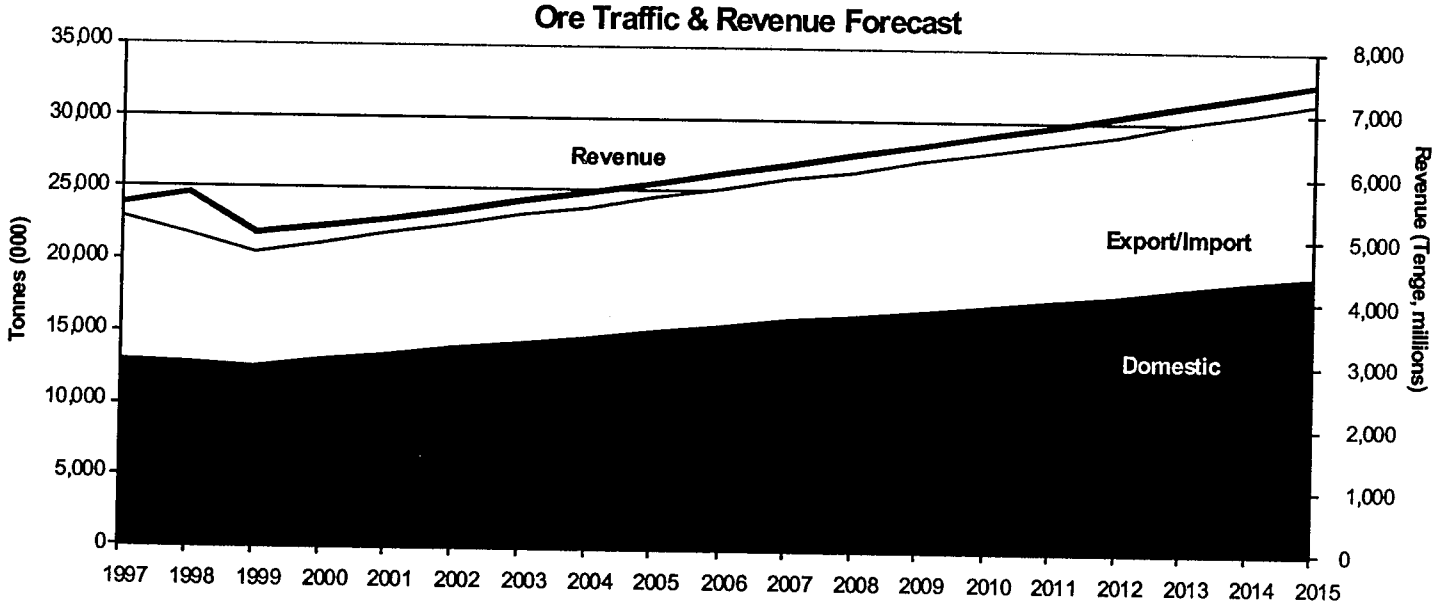
[42] "Kazakhstan: Kazakhs, Trans-World Open 1.2 Bln Aluminum Project," *Reuters New Service* (07/06/97).
[43] "Kazakhstan: Kazakh Aluminum Plant on Hold Amid Investor Woes," *Reuters New Service* (30/11/98).
[44] "Kazakhstan: Kazakhstan-Kazsink Will Nearly Triple Production," *Chemical Business Newsbase* (10/12/98).
[45] "KazChrome," *Global Securities Company Research* (May 1998).

- ***Aksu Ferroalloy Plant.*** Also part of the KazChrome family, the Aksu Ferroalloy Plant is one of the largest ferroalloy producers in the world with capacity of 1.1 million tonnes. Ferroalloys are used in the production of stainless steel, and the market for them has remained strong, despite the Asian crisis. All Aksu's productions is sold by Millennium 2000, KazChrome's trading company.[46] About 80 percent of sales are export—sales on world markets that bring cash to Kazakhstan.

- ***Liskovsky.*** This firm is an iron ore producer in northern Kazakhstan. In 1998, it produced and shipped over 1 million tonnes via KTZ. Its largest customer is Ispat Karmet. The firm is in the midst of a restructuring/work out plan to pay back wages and other debts.

- ***Kazakmys.*** Kazakhmys is a holding company containing copper mining and benefaction facilities and heating/energy interests. It is controlled by Samsung, which plans to invest $700 million developing new mines. In addition to its coal (discussed above), Kazakhmys plans to ship approximately one million tonnes of copper concentrate and copper product in 1999.

Traffic & Revenue Forecast. Domestic traffic accounts for nearly 60 percent of KTZ's ore revenue. Domestic ores are shipped to processing sites, which then sell their products (e.g., aluminum ingot, rolled steel) in both Kazakhstan and other countries, primarily Russia. About a quarter of the ore shipped is for the steel industry. This demand is linked to the forecast for iron and steel products. The remainder is expected to be a function of the Kazakhstan and Russia industrial GDP's in equal weight.



With the price discounts provided to Kazzinc, Balkhash Mining, Aluminim of Kazakstan and others, average revenue per tkm is expected to drop by six percent in 1999. Because transport and source competition options for ore are limited and transport is only a modest portion of the delivered price of the end product, we estimate the price elasticity of demand is 0.15 for this traffic. Consequently, the six percent rate decrease yields a one percent traffic increase.

[46] "KazChrome," *Global Securities Company Research* (May 1998).

International traffic accounts for 41 percent of KTZ's ore revenue. The demand for export ores/ore transport is driven largely by industrial activity in neighboring countries (weighted 90 percent to Russia, 10 percent to Uzbekistan). Consequently, demand is expected to drop 14 percent in 1999 and recover slowly in subsequent years.

Although export ore demand is price inelastic, export traffic is likely to be more price sensitive than domestic traffic, as many of the products are being sold on competitive world markets. The price elasticity of demand is estimated at 0.5 for this traffic. We expect the price discounts given to various ore producers to result in an average price decrease of five percent in 1999, with 2.5 percent gain in traffic. This is set against a decline in demand from Russia and others of 14 percent. Over the following three years, we expect additional traffic to be paid in cash and receive rate discounts.

The drop in export ore traffic, together with price discounts, is expected to drop ore revenue by 11 percent in 1999. Growing traffic will push revenue back to the 1998 level by 2004, with steady gains expected thereafter.

3.3.5 Ferrous Metals

In 1998, ferrous metals business generated six percent of KTZ revenue and somewhat less of its tonnes and tonne-kilometres.

1998 Iron & Steel Traffic & Revenue (excludes transit)

	Revenue (Tenge, millions)	Share of Revenue	Revenue per TKM	TKM (millions)	Share of TKM	Tonnes (thousands)	Share of Tonnes
Domestic	1,133	39%	0.73	1,556	29%	2,120	39%
International	1,804	61%	0.48	3,787	71%	3,375	61%
Total	2,937	100%	0.53	6,157	100%	5,495	100%

Source: KTZ traffic data. Eleven months annualized.

KTZ's largest ferrous metals customer is Ispat Karmet. (Ispat accounts for about three-quarters of KTZ's export tonnage.) Ispat is Kazakhstan's sole steel producers and operates the Karaganda steel mill. Since 1995, Ispat has been run by British-Indian LNM Group. Production was 2.6 million tonnes of steel in 1998, down from 2.8 million tonnes in 1997.[47] Ispat exports nearly all of its productions.[48] As part of an international group, which is the fifth largest steel producer in the world,[49] Ispat participates in a global marketing network. It has entered new markets as economic decline reduced the demand for steel in Russia and Asia.

[47] "Kazakhstan: Production Falls at Ispat Karmet," *Metal Bulletin* (10/12/98).

[48] "At present, the domestic market in Kazakhstan consumes only around 100,000 tpy of steel, all of which is accounted for by Ispat Karmet." "Kazakhstan: Ispat Karmet Seeks New Export Markets-Asia," *Metal Bulletin* (28/09/98).

[49] "Ukraine: Ispat Karmet to Export Sheet Through State," *IPR Strategic Business Information Database* (05/01/99).

Current markets are show in the table below.

Country/Region	Share of Sales
China	33
Middle East	26
North & South America	18
Central Asia	16
CIS and rest of world	7

Source: Ispat Karmet.

Ispat expects the decline in traffic for 1998 to be a temporary setback, and is forecasting sales of 2.9 million in 1999 and 3.5 million in 2000.

Competition & Pricing. Ispat transports nearly all its production by rail. Its products compete with steel manufactured world-wide. Only in Western China does Ispat have a very strong cost advantage and a dominant market position. Ispat products command about $400 per tonne.[50] Freight charges to China are about 8 percent of delivered value for movements via Druzhba. For movements via the Trans-Siberian Railway to Nahodka, freight transport charges are about 50 percent.[51] Ispat continues to use both routes to maintain competition between railways and because of capacity constraints via Druzhba. Ispat believes that lower transport rates from KTZ could help it enter some steel markets, such as Iran. Depending on the cost of the movement and the rate Ispat needs, this could be an opportunity for a mutually beneficial new volume discount.

Ispat asserts that KTZ is pricing itself (and Ispat) out of numerous other markets. For example, Ispat lost a sale of coke to a customer in Zhambul, because KTZ insisted on a price of $29 per tonne. The customer is now buying coke from Russia and paying KTZ $20 per tonne for transport from Russia. Ispat believes high transport prices from KTZ have cost it markets in slag, tar, and ammonium nitrate. These may or may not be profitable opportunities for KTZ. KTZ needs specific cost information for the movements to determine their potential contribution.

Revenue Collections. Ispat Karmet reports that it prepays its freight bills in cash. This is consistent with Ispat's refusal to engage in barter trade generally.[52] Specific information on other ferrous metals shipper payment record is not available. In general, firms selling on international metals markets have more cash than other Kazakhstan firms.

Traffic & Revenue Forecast. Domestic traffic accounts for about two-fifths of KTZ's ferrous metals revenue. Domestically, metals are shipped to fabrication sites and scrap to production sites, with buyers of the ultimate product located in Kazakhstan and other countries including Russia. We therefore expect the demand for iron and steel products transport to be a function of the Kazakhstan and Russia industrial GDP's with Kazakhstan weighted four times as heavily as Russia.

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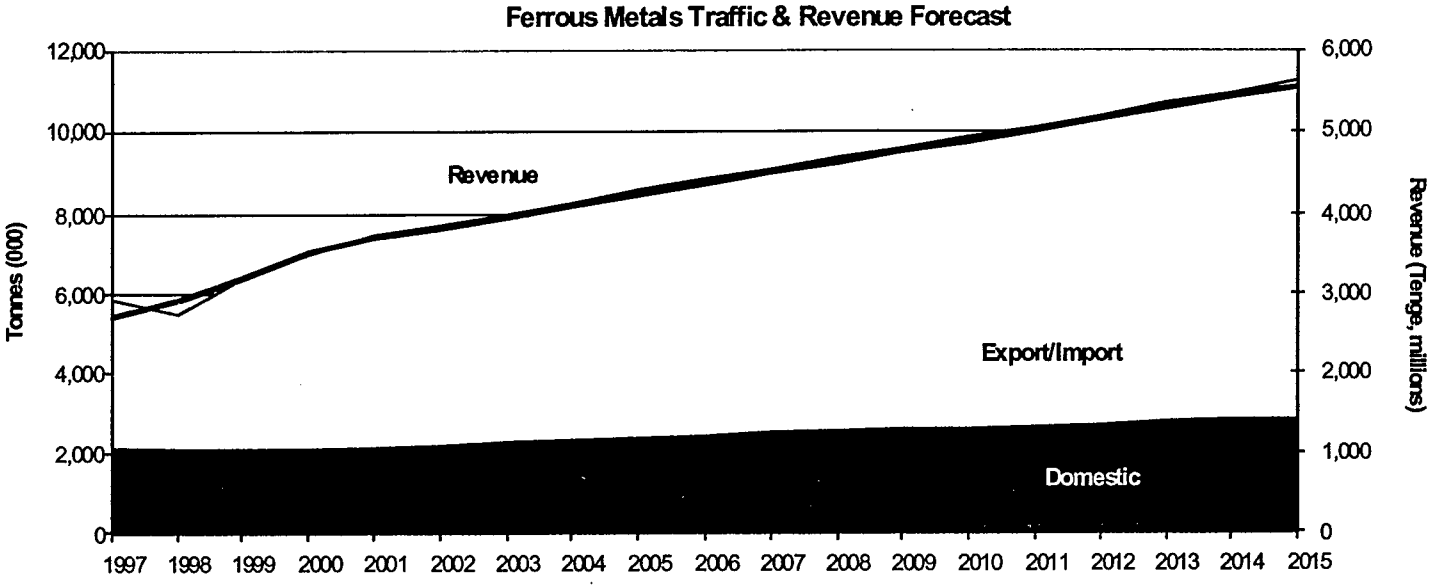
[50] "Kazakhstan: Ispat Karmet Expects Reduced Output in 1998," *IPR Strategic Business Information Database* (26/10/98).

[51] Interview with R N Thakur, General Manager of Transport & Services, Ispat Karmet and Y P Kumar, General Manager of Marketing, Ispat Karmet (February 18, 1999).

[52] "[W]e believe in international standards of practice. We do not have barter trade..." Malay Mukherjee, General Director as quoted in "Kazakhstan: Ispat Karmet Seeks New Export Markets-Asia," *Metals Bulletin* (28/09/98).

Because transport and source competition options for iron and steel are limited and transport is only a modest portion of the delivered price of the end product, we estimate the price elasticity of demand is 0.3 for this traffic.

Export/import traffic accounts for three-fifths of KTZ's iron and steel revenue. The demand for export metals transport is driven by industrial activity in China, Russia and the rest of the world. We have linked KTZ's export forecast to the industrial GPD's of these countries in the long term and have adjusted the near-term forecast to conform to Ispat Karmet's sales forecast. Consequently, demand is expected to increase sharply in 1999-2001 and grow more slowly in later years.



Although export ferrous metals demand is price inelastic, export traffic is likely to be more price sensitive than domestic traffic, as the product is being sold on competitive world markets. The price elasticity of demand is estimated at 0.4 for this traffic. This means that the price discount reported by Ispat (12 percent on Ispat's three-fourths of the traffic) would result in a three percent increase in traffic.

The sharp increase in export traffic and moderate growth in domestic traffic is forecast to push KTZ revenue from ferrous metals to 3.5 billion tenge in 2000 and to 5.6 billion by the end of the forecast period.

3.3.6 Timber

In 1998, timber business produced two percent of KTZ revenue and tonne-kilometres, and somewhat less of its tonnes. Timber is produced in the eastern part of Kazakhstan by the firm Zyryanovsky.

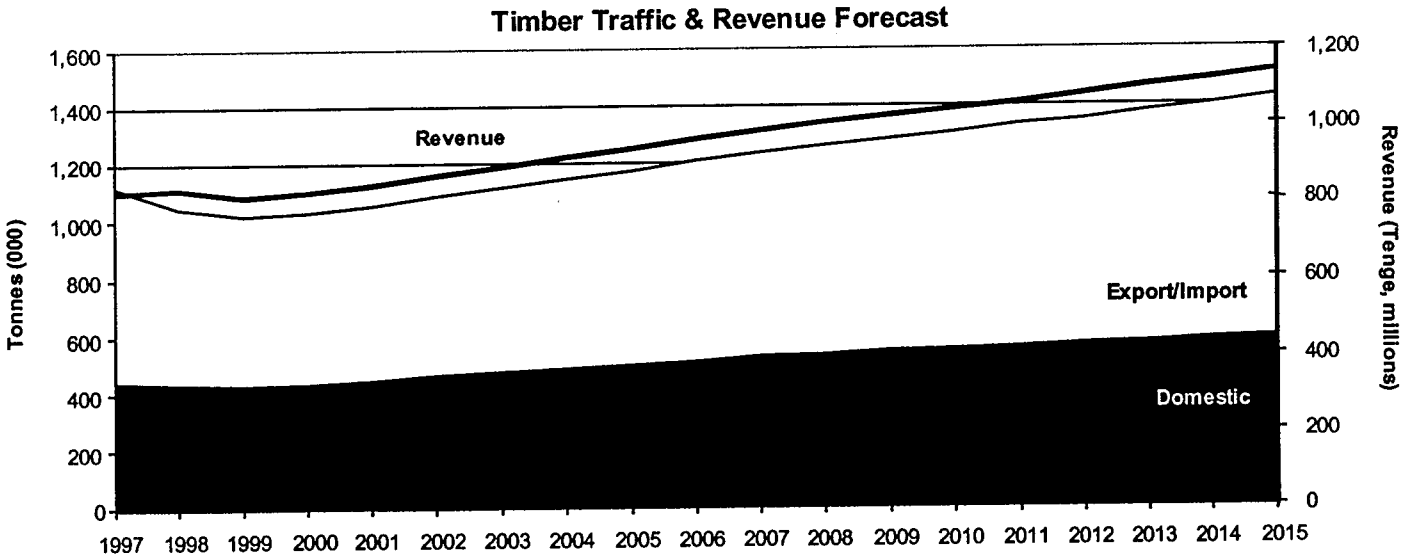
1998 Timber Traffic & Revenue (excludes transit)

	Revenue (Tenge, millions)	Share of Revenue	Revenue per TKM	TKM (millions)	Share of TKM	Tonnes (thousands)	Share of Tonnes
Domestic	347	41%	0.68	508	34%	433	41%
International	490	59%	0.50	981	66%	612	59%
Total	837	100%	0.56	1,489	100%	1,045	100%

Source: KTZ traffic data. Eleven months annualized.

Traffic and Revenue Forecast. Domestic traffic accounts for about two-fifths of KTZ's timber revenue. We expect the demand for timber transport to be a function of the Kazakhstan industrial GDP. Because source competition options for timber are significant and transport is a large share of the delivered price of the end product, we estimate the price elasticity of demand is 0.75 for this traffic.

Export/import traffic accounts for about three-fifths of KTZ's timber revenue. The demand for export and import transport of timber is related to building activity in both Kazakstan and its neighbors. This has been represented by making demand a function of the GDPs of all four countries, weighted 50 percent to Kazakstan, 25 percent to Russia, 20 percent to Uzbekistan and 5 percent to China. Demand is expected to drop four percent in 1999 and recover slowly in subsequent years. Export/import timber demand is thought to have the same price elasticity (0.75) as domestic demand, because transport is a large share of the delivered price of the product.



Overall, revenue from timber business is expected to decline 2 percent in 1999 and recover, starting in 2000.

3.3.7 Construction Materials

In 1998, construction materials business generated three percent of KTZ revenue, six percent of its tonnes and five percent of tonne-kilometres.

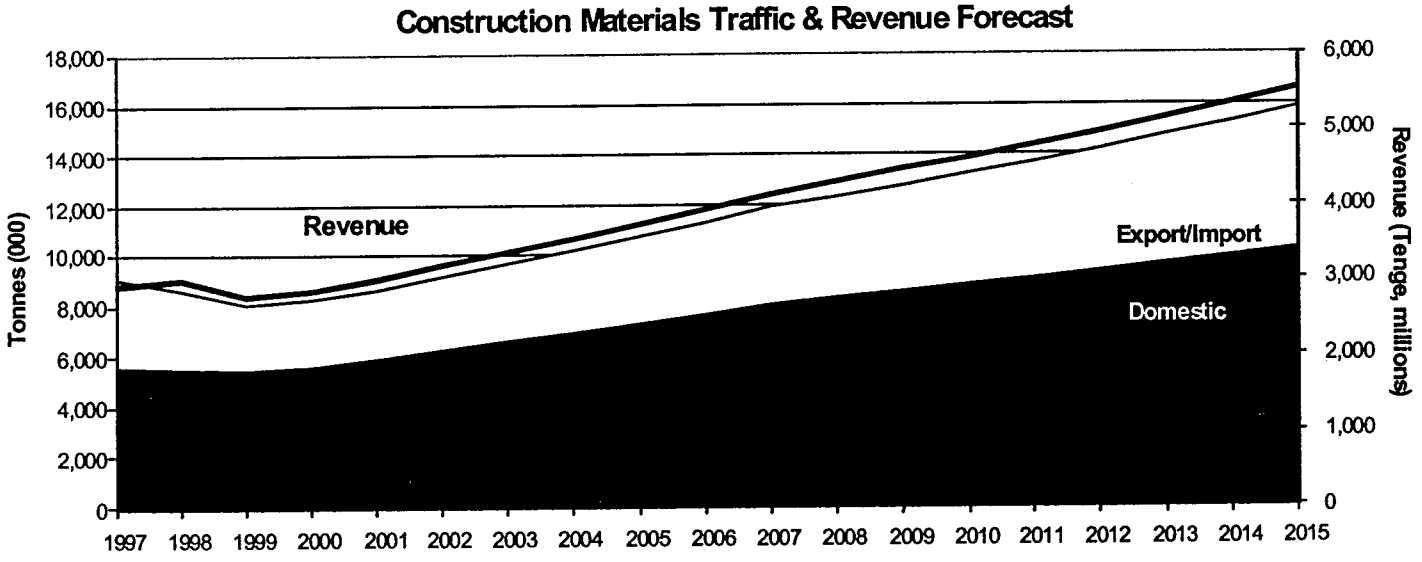
1998 Construction Materials Traffic & Revenue (excludes transit)

	Revenue (Tenge, millions)	Share of Revenue	Revenue per TKM	TKM (millions)	Share of TKM	Tonnes (thousands)	Share of Tonnes
Domestic	1,934	64%	0.57	3,376	56%	5,525	64%
International	1,093	36%	0.42	2,630	44%	3,123	36%
Total	3,027	100%	0.50	6,006	100%	8,648	100%

Source: KTZ traffic data. Eleven months annualized.

A range of customers, mostly located in eastern Kazakhstan, make up this line of business. Koktas, a sand and gravel producer, is among KTZ's top 25 customers. It shipped about 1.2 million tonnes in 1998. Also included are several cement suppliers and manufacturers of asbestos materials such as roofing tiles. KTZ indicates that much trucking competition exists for this construction group.

Traffic and Revenue Forecast. Domestic traffic accounts for almost two-thirds of KTZ's construction materials revenue. Construction activity is very sensitive to the overall state of the economy. We therefore expect the domestic demand for construction materials transport to be a function of the industrial GDP of Kazakhstan. Because construction materials are produced in many locations and transport is a relatively high portion of the delivered price of the end product, we estimate the price elasticity of demand is 0.75 for this traffic.



Export/import traffic accounts for about a third of KTZ's construction materials revenue. The demand for export and import construction materials is a driven by economic activity in Kazakhstan (for imports) and economic activity in neighboring countries (for exports). Therefore demand has been made a function of the GDPs of the four countries (weighted 25 percent to Russia, 20 percent to Uzbekistan, 5 percent to China and 50 percent to Kazakhstan). Over time, the weighting for China increases. Consequently, demand is expected to drop 4 percent in 1999

and recover slowly in subsequent years. The price elasticity of demand for export and import construction materials is estimated at 0.75 for this traffic, because the transport price represents a relatively high proportion of the delivered price of the product. Overall revenue from construction materials is expected to decline 7 percent in 1999 and recover starting in 2000.

3.3.8 Mineral Fertilizers

In 1998, fertilizer business generated one percent of KTZ revenue, tonnes and tonne-kilometres. The fertilizer business has seen heavy reductions in volume, due to the decline in agricultural production in Kazakhstan and to lower intensity application of fertilizer in the post-Soviet era. Lack of credit for small farmers has further reduced demand, as farmers in Kazakhstan and the CIS generally "have had difficulty in financing purchases of fertilizers, high quality seeds or new machinery."[53]

Domestic traffic accounts for about two-fifths of KTZ's fertilizer revenue. We expect the demand for fertilizer transport to be a function of the demand for grain (both domestic and international), but because of farm credit issues, to grow at one percentage point less per year.

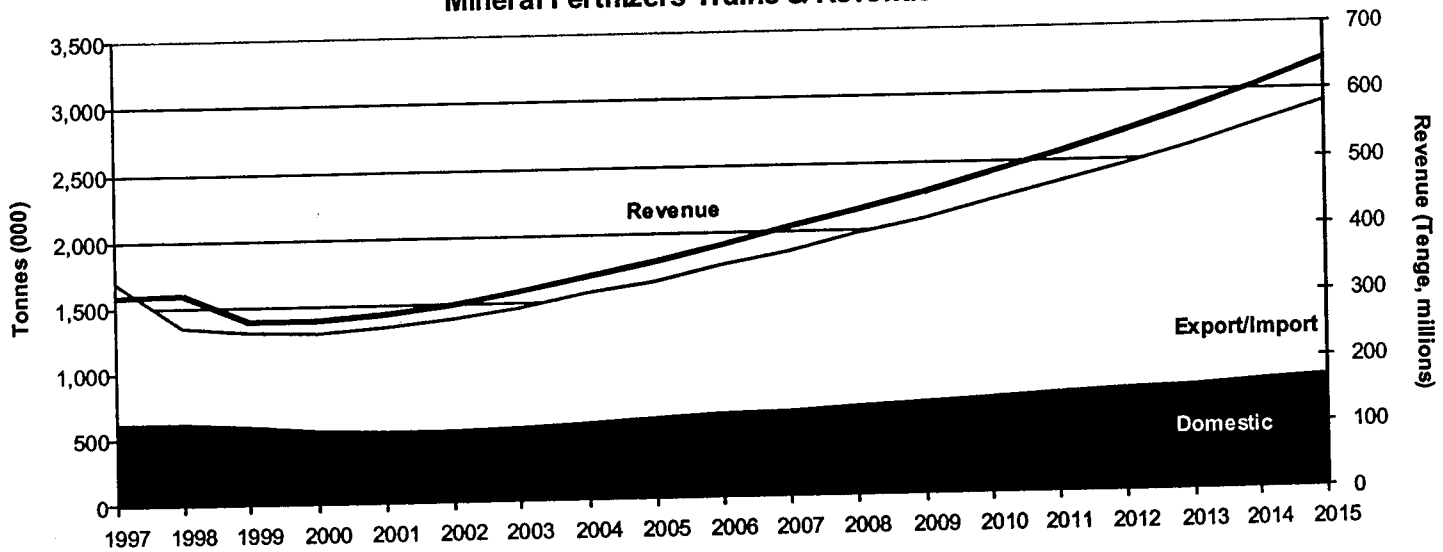
1998 Fertilizer Traffic & Revenue (excludes transit)

	Revenue (Tenge, millions)	Share of Revenue	Revenue per TKM	TKM (millions)	Share of TKM	Tonnes (thousands)	Share of Tonnes
Domestic	125	39%	0.34	368	38%	615	46%
International	194	61%	0.32	610	62%	734	54%
Total	319	100%	0.33	978	100%	1,349	100%

Source: KTZ traffic data. Eleven months annualized.

Export/import traffic provides two-fifths of KTZ's fertilizer revenue. The demand for export and import fertilizer movements is driven by overall GDP in Kazakstan and neighboring countries. Consequently, demand is expected to drop six percent in 1999, but recover quickly in later years.

Mineral Fertilizers Traffic & Revenue Forecast



Because transport and source competition options for fertilizer are limited, we estimated the price elasticity of demand for domestic traffic is 0.2 percent. Although export fertilizer demand is price

[53] PlanEcon, *PlanEcon Review and Outlook for the Former Soviet Republics* (October 1998), p. 120.

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by the author – not for public access.

The KTZ network is shown below by track class, line thickness shows 1997 traffic density.

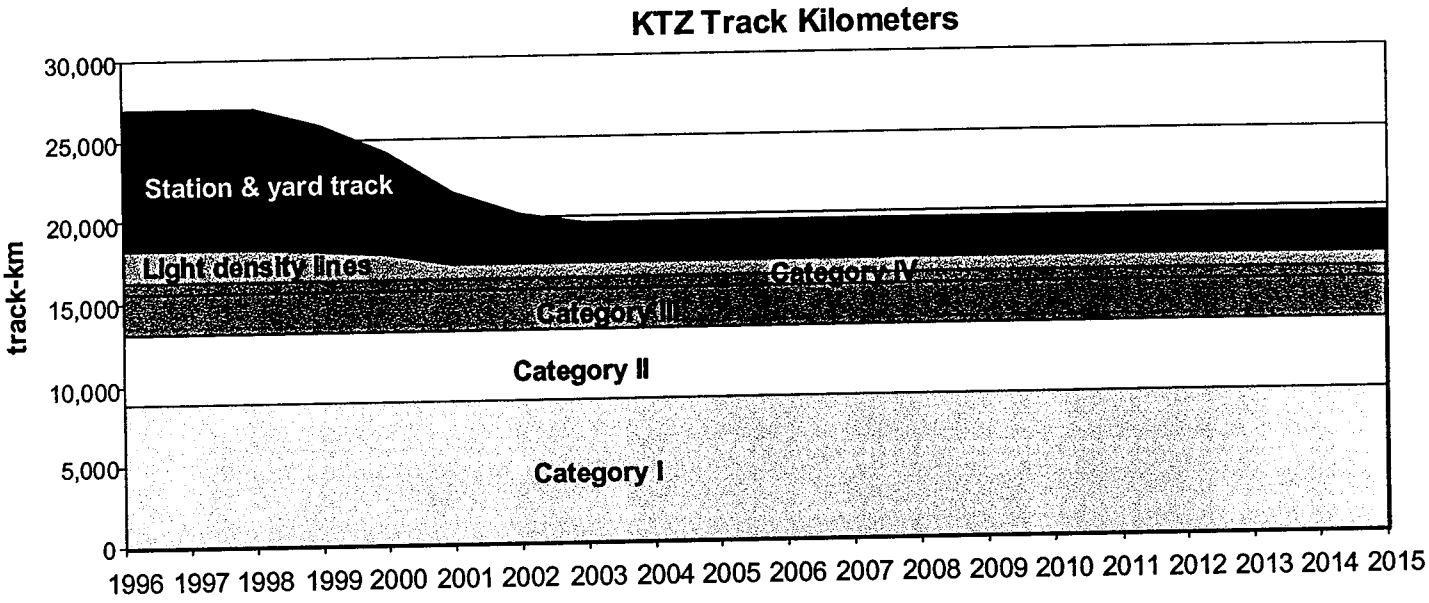
Track in the top two categories will receive new materials and western-style track fastening systems at renewal. Track in lower categories will receive second-hand materials. In the future, KTZ should define track-geometry and maintenance-condition standards for each track category.

Category	Route Kilometers	% of Total	Cumulative %	Billion Ton Kilometers	% of Total	Cumulative %
I	5,200	39%	39%	71.0	65%	65%
II	2,900	21%	60%	24.9	23%	88%
III	2,500	19%	79%	10.8	10%	98%
IV	800	6%	85%	1.6	1%	99%
LIGHT DENSITY	2,000	15%	100%	0.9	1%	100%
STATION & YARD	8,700[60]	0%	100%	0	0%	100%
Total	**13,400**	**100%**		**109.2**	**100%**	

Upon inspection, it appears that some track has been assigned a higher category than is necessary either due to density or the operation of high-speed trains. In particular, the line from Druzhba to Mointy and from Aktogay south to Almaty should be assigned a lower category. So, too, should the lines north of Aktogay, densities do not yet warrant a higher classification. Even though the

[60] KTZ has 8,700 track-kilometers of station and yard track. These do not contribute to total route-kilometers. KTZ operates 26,900 track-kilometers in total. Some of the route-kilometers shown above include double track segments.

lines are strategically important, the low density of traffic does not warrant the use of new materials or require an expensive infrastructure. Management of track classifications and permitted track speeds can be a very useful tool in reducing overall track maintenance costs while ensuring safe train operations. KTZ should continue with this effort and review similar track classification systems used in North America and Australia.



Over the next few years, KTZ intends to reduce the total kilometers of track it must maintain. The reductions are likely to be made in the last two categories (Light Density and Station and Yard track), as KTZ transfers lines to customers and closes little used stations and unnecessary yards. We have assumed that total track-kilometers reduced from 26,900 to 19,600 by 2003. Most of the reduction in track-kilometers is from the closure of station and yard tracks. Development of a new train operating plan, including a consolidated marshalling yard strategy, permits a significant reduction in track-kilometers. Route kilometers are assumed to be reduced from 13,300 to 12,300 kilometers—all from elimination of light density lines and sidings leading to customer facilities.

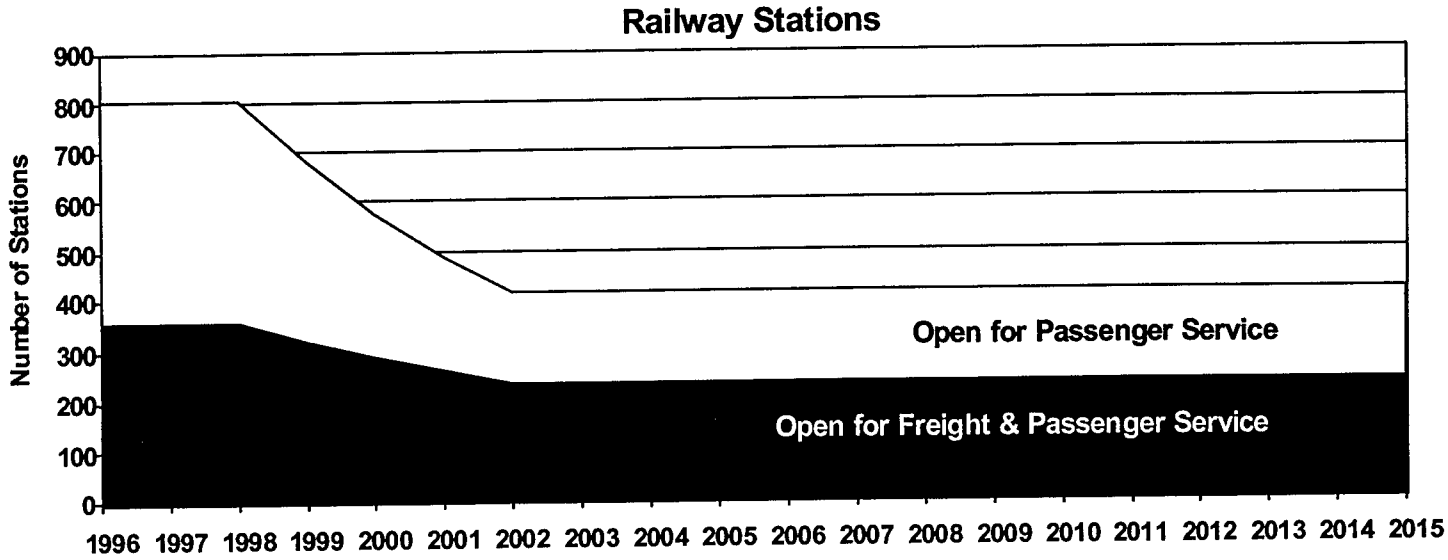
Such reductions are an essential part of sizing the network for existing traffic and reducing wasteful spending on unneeded track facilities. Track kilometer reductions will lower staffing required for track maintenance; civil forces (reduced number of artificial facilities—cuts and fills, bridges, culverts, etc); materials costs and depreciation charges.

The cost of track maintenance will also reduced by other programs, described in later sections, including changing work methods, investments in new track machinery, restructuring of work forces and privatization of renewals gangs.

4.2.2 Station Reductions

As with other infrastructure assets, KTZ has too many stations and intends to close some of them. We have assumed that the number of stations will be reduced from about 800 (360 freight and passenger stations, 440 passenger only stations) to 430 (235 combined stations and 185 passenger only stations). The reduction in stations stems from several sources: development of a

new operating plan, elimination of light-density lines, automation of billing and station record keeping, and development of customer service centers. The chart below shows the expected rate of station reduction. The program begins in 1999 with the closure of the smallest stations and continue as automation, a new operating plan, customer service centers, and mobile station agencies are introduced.



Financially, station closures reduce Freight & Commercial Services staffing (station-masters, clerical, and loading and unloading staff); Civil forces (station upgrading and construction projects), and Track forces (station and building maintenance forces). Materials costs are reduced modestly (since these are the smallest stations). Depreciation shrinks in line with station facilities. As smaller stations are closed, some measures of productivity (*e.g.*, station-staff-per-station) increase as only the largest stations remain in the system.

4.2.3 Locomotive Fleet

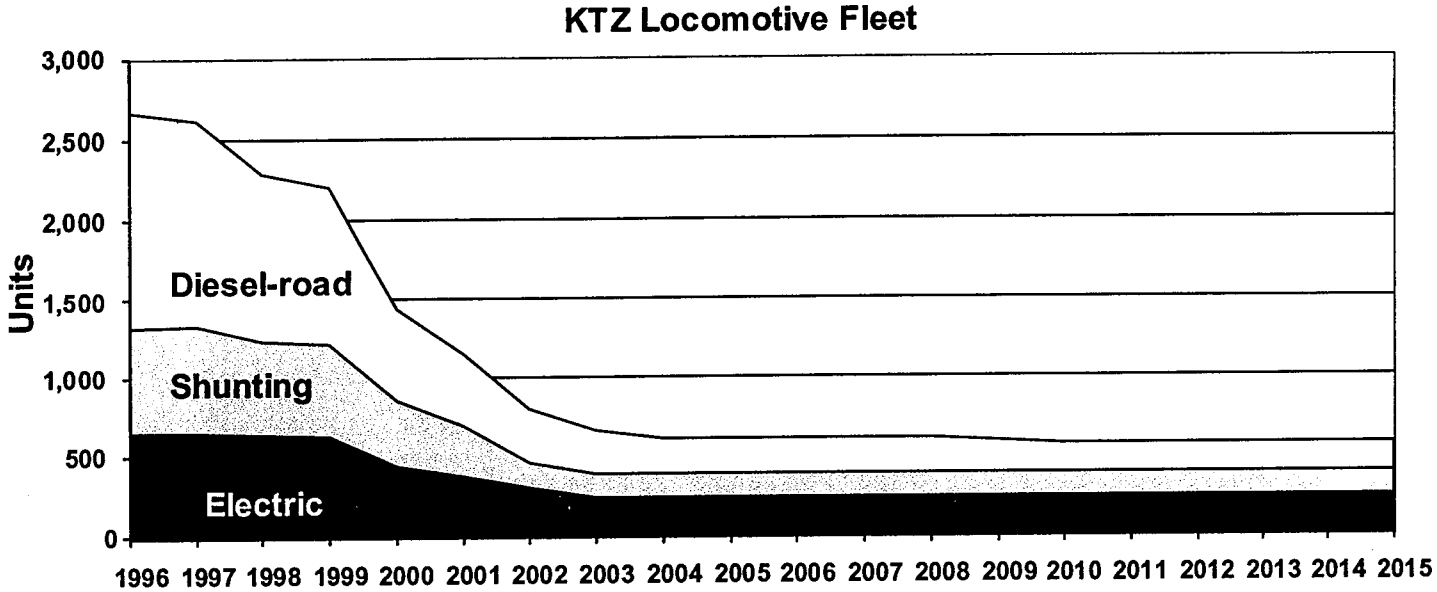
At the beginning of 1999, KTZ owned about 2,200 locomotives. Of this number, KTZ estimates that it had some 680 surplus locomotives in reserve and about 400 in maintenance—leaving a total active fleet of about 1,120, or 50 percent of the total owned.

	Total	Reserve	Maintenance	Active Fleet
Electric	630	180	120	330
Passenger			30	90
Freight			85	240
Diesel Electric	1,570	500	280	790
Passenger			40	120
Freight			115	325
Shunting			125	345
Total Fleet	**2,200**	**680**	**400**	**1,120**

KTZ does not need to maintain nearly 700 locomotives in reserve status. Neither freight nor passenger traffic are expected to grow rapidly in the next few years, and will not recover to 1990 levels for many decades, if ever. A new operating plan, centralized control of locomotive

operations, changes in locomotive fleet management, and acquisition of new locomotives will act to improve utilization of the locomotive fleet and further reduce the number required.

Therefore, we have assumed that reserve locomotives are retired from the fleet over the three-year period from 1999 to 2001. This reduces the electric locomotive fleet by 30 percent, from 630 to 440 units in 2000 by eliminating reserve units. The diesel fleet shrinks from 1,570 to about 1,000 in 2000 by the elimination of reserve locomotives. Fleet retirements continue as locomotive utilization improves and excess locomotives are eliminated from the fleet. By 2003, the total electric fleet is about 250 units; the diesel fleet is about 400 units.



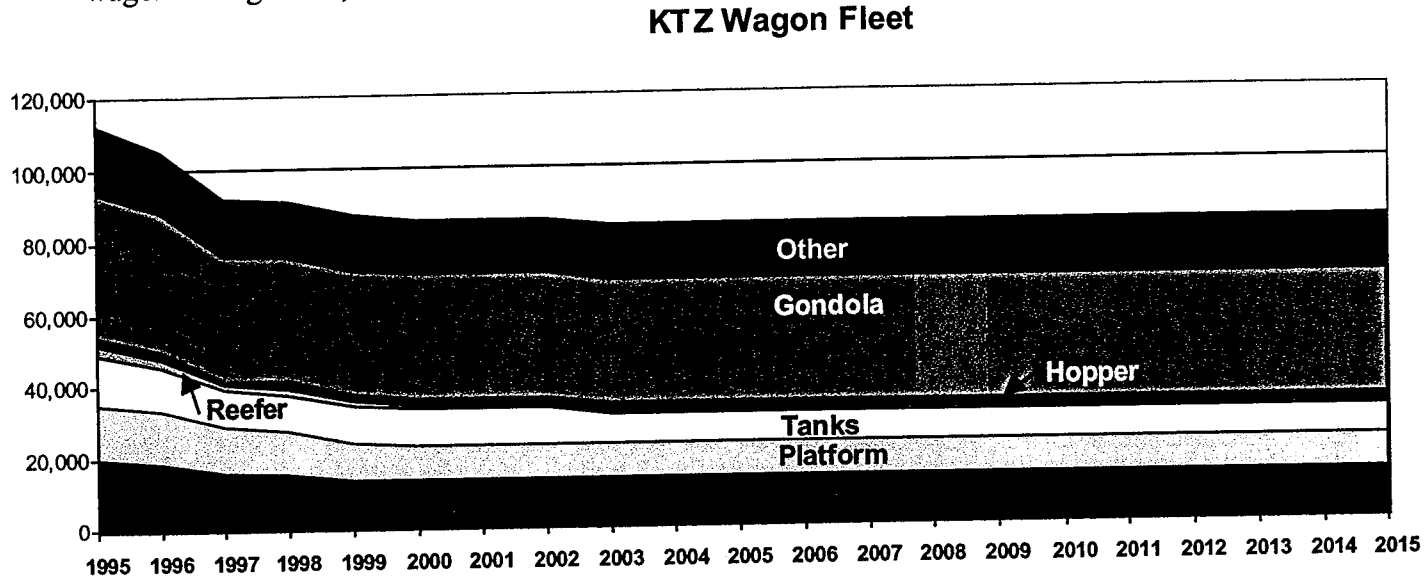
The change in locomotive fleet reduces depreciation charges. In addition, the elimination of locomotives reduces the cost of maintaining the fleet and the need for locomotive depots. Together with the other reform programs, this reduces cost of locomotive and facility maintenance.

4.2.4 Wagon Fleet

Upon settlement with CIS railroads in 1996, KTZ acquired a fleet of more than 110,000 freight wagons of various types. KTZ has reduced this fleet to about 91,000 wagons in 1998 and a planned 87,500 in 1999. KTZ appears to achieve good utilization of its freight wagon fleet. Our calculations show average cycle times of about 9 days, an average haul of about 670 kilometers and an average of 61 tonnes-per-wagon. As described in the Marketing Chapter, rail freight traffic is expected to increase steadily after a dip over the next two years. With these relatively high rates of utilization and increasing traffic, the wagon asset reduction program is not aggressive. As new maintenance methods and consolidation of wagon workshops increases their productivity, the number of wagons out of service can be reduced from the current 30 percent to a more normal level of 10 percent to 12 percent. This, coupled with better management of the wagon fleet and improved operating practices, will permit a modest reduction in the number of wagons in the fleet. We have assumed that the wagon fleet is reduced to 84,000 by 2003.

Since traffic is down by nearly 70 percent from its 1990 peak and the wagon fleet has not been reduced comparably, further reductions would seem possible. However, estimated cycle times seem to short for much further reduction (8 days between loads on average over a haul length of

about 690-kilometers by 2015). It must be noted that the consulting team constructed wagon-type utilization levels from a series of assumptions about empty-wagon kilometers, average tonnes-per-wagon by type of wagon and the distribution of wagonloads by type of wagon and commodity.[61] KTZ data were not detailed enough to provide actual performance data for these parameters. It is possible, and may be likely, that KTZ can achieve even better wagon utilization than we have projected and be able to reduce its wagon fleet further. While the proposed new operating plan should act to speed wagon flows, it is possible that actions to reduce operating costs (such as elimination of intermediate marshalling facilities and operation of longer direct-to-destination trains) could adversely affect wagon utilization. On balance, we believe that wagon velocity will be improved substantially as a result of revised operating practices, centralized wagon management, and concentration of wagon repair depots.



In that event, we would encourage KTZ to retire old and expensive to maintain wagons, while rebuilding or refurbishing wagons in high demand to extend their useful life. Such actions can extend the life of assets, minimize investment needs and slowly improve the overall condition of the wagon fleet. The investment program developed for this analysis includes refurbishing of tank wagons and some investment in wagon renewal in the latter part of the period.

4.3 New Railway Operating Practices

KTZ traffic levels have changed significantly since the breakup of the Soviet Union. This has not been matched by changes in the KTZ operating plan and network of marshalling yards and terminals. A new operating plan, with network simplification would reduce KTZ cost in many ways. KTZ should also benefit from operations automation processes in common use on other heavy freight railways. Such processes include centralized train management, service design, billing and station clerical functions as well as locomotive, wagon and driver management. The principal elements of these programs are described below.

[61] Values for these assumptions are clearly shown in the Wagons section of the financial model (Appendix II). Our assumptions were based upon scattered aggregate data from KTZ and our experience with similar railways.

4.3.1 New Operating Plan

Given the significant changes in traffic volumes and the direction of major flows, we believe that KTZ will benefit from a new operating plan—designed to reduce shunting, consolidate marshalling terminals, and extend the size of trains operated. In our experience, when traffic flows have changed significantly, revised operating strategies can reduce operating costs substantially.

We believe a complete review of train operating practices, marshalling facilities, station facilities, staffing and operations management practices is in order. The review should involve a complete rethinking of KTZ operations with the objective of developing a new set of train schedules and switching instructions for all KTZ freight traffic. The review should be conducted by KTZ field operations and scheduling staff working with the outside experts, who can bring new operating ideas and practices to a detailed analysis of KTZ operations. A computer simulation model[62] should be used to analyze different operating strategies, train lengths, marshalling yard strategies, and wagon-to-train assignment practices. KTZ field and headquarters staff should be closely involved in the modeling effort to encourage a transfer of knowledge as well as ensure that the computer modeling process is as realistic as possible.

In our experience, such efforts often result in significant changes in operating practices and substantial reductions in operating costs. The plan should provide for the introduction of unit-train type operations, where locomotive and freight wagons are operated as a unit between loading and unloading processes. For general freight operations, the new operating plan should maximize the use of trains blocked at origin to operate intact to distant destinations, and the use of local collection trains to bring mixed freight to marshalling centers. The work of trains should be designed so that freight traffic will experience the minimum number of handling as it moves across the railway. Trains blocked for foreign destinations, with pre-cleared customs and boarder formalities can reduce dwell times at boarder crossing points, reduce labor and handling costs and improve the utilization of freight cars and locomotives.

Passenger train operations should also be studied in detail. Passenger train schedules should be assembled with the aim of maximizing equipment utilization, reducing the time required to turn passenger equipment and keeping equipment sets intact. Suburban trains should be similarly scheduled to maximize the running time of the equipment and minimize the number of drivers and on-board staff required. Schedules should be designed to minimize station stopping and lightly used stations should be closed or down-graded to stops (see asset reduction program).

In this case, we have assumed that a new plan will result in somewhat increased train sizes, reduced switching, and consolidation of shunting terminals and stations. The impacts of the new operating plan will be felt in improved utilization of locomotives, wagons, and crews. These improvements result in productivity gains, *e.g.*, fewer train-kilometers per tonne-kilometer. In addition, more station and yard track will be made available for the asset reduction program. We assumed that implementation of the new operating plan would start in 2000 and take a couple of years to complete.

[62] Similar to the MultiRail Network Simulation System (MultiModal Applied Systems, Princeton, NJ), the Berkeley Network Simulation Model (Berkeley Simulation Systems, Inc. Berkeley, CA), or the ALK operations simulation model (ALK Associates, Princeton, NJ).

4.3.2 Operations Automation

Most railways have found that operations automation tools are essential for efficient operations. Such tools have the added benefit of providing operating statistics, greatly improved customer service capability, and improving billing and accounting data. KTZ's restructuring and investment programs appear to include the appropriate investment elements in its capital plan for evaluating restructuring options. The consultant's investment program includes investments in improved communications, new computer hardware and software, and centralized automated dispatching systems.

The three regional dispatching systems are the basis for implementing the new operating plan and new crew and locomotive management processes described in later sections. We envision co-location of operating and customer service centers at each of the centralized dispatching centers. At these operations control centers, information about customer orders would be gathered, train services designed, wagons distributed, locomotives managed and distributed, and train drivers and assistants managed. Station agent or clerical work throughout the surrounding region would be concentrated in co-located customer service centers. Here, clerical staff would accept customer orders, develop billing information, enter shipment data into the operating systems, answer customer inquiries, handle service issues, schedule wagon placement and pickup, write work-orders for terminal crews, manage wagon inventories, schedule any required weighing or loading services, and perform similar customer service related functions.

The communications and computing systems automate station work and permit the development of a full service customer service center and the elimination of clerical activities from freight stations, centralization of waybilling, shipment tracing, and the execution of customer service requests.

Contrary to KTZ's initial restructuring plan, we believe customer service functions should not be outsourced or privatized separately from train operations. In any commercial endeavor, customer service functions are a central part of service delivery and should be integrated with traditional operating functions. Rather than outsourcing or privatization, we believe that customer service functions, coupled with new operating information systems, and operations automation, should be an integral part of work planning, train scheduling and rail service design. Customer service center employees should distribute equipment, determine wagon classification work, and become the core source of information for train schedule design and work planning.

These changes will affect train size, locomotive utilization, commercial and freight services staffing—especially at stations, crew productivity, and wagon utilization. The number of times a wagon must be handled at intermediate locations will also be reduced. The changes will allow KTZ to concentrate marshalling activities at fewer larger faciliites, eliminating many wagon-handlings and use more productive facilities for those shunting movements that must be made.

4.3.3 Locomotive and Driver Management:

Currently, KTZ assigns locomotive to depots, and within depots, locomotives to particular services and drivers to particular locomotives. We think the linkages between depot and locomotive, and locomotive and driver should be severed—each element should be managed separately to reduce costs, maximize utilization of expensive assets, and develop economies of scale in depots. KTZ has far too many locomotive depots, especially if the locomotive fleet is modernized (such modernization is included in the investment program). KTZ recognizes this and plans to reduce the number of locomotive depots from about 35 to 30 or so.

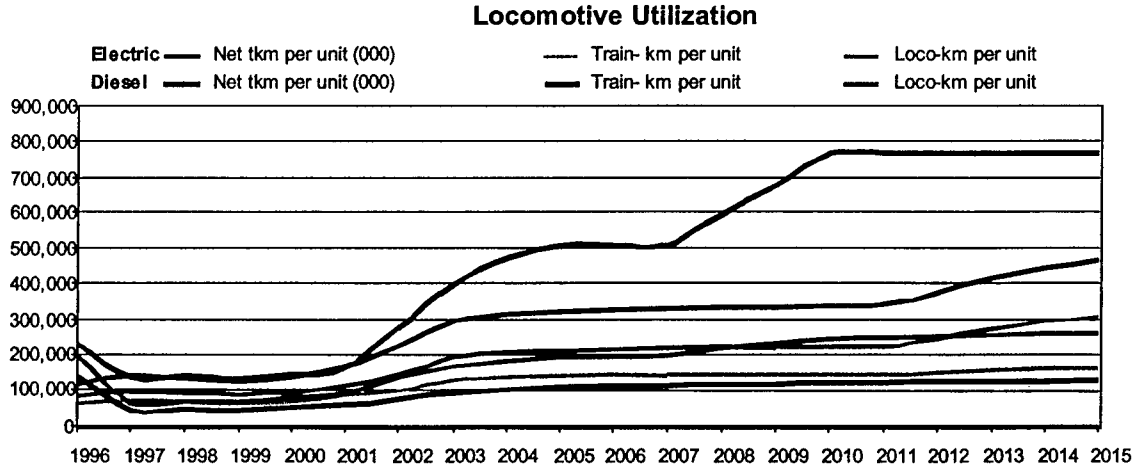
By severing the relationship between depots, locomotive and driver assignments and locomotive maintenance, KTZ can design locomotive and driver trip schedules that produce much greater locomotive and driver-crew utilization. With this approach, locomotives are scheduled on trains to move from origin terminals to destination terminals, with intermediate fueling scheduled as necessary. Return or onward locomotive schedules are developed for trains and locomotive simultaneously. Locomotive maintenance can be scheduled to occur at specific depots. Schedules can be arranged so that depots can specialize in a particular type of locomotive or locomotive maintenance function. Many depots can be reduced to fueling and inspection facilities and driver on- and off-duty points. Given KTZ's current and planned locomotive fleet, a single major workshop for electric locomotives and one or two for diesel-locomotives should be sufficient. Several intermediate sized, component change-out depots could be located at traffic centers to provide quick intermediate inspections, cleaning, fueling and servicing, and minor repair services. KTZ should require no more than eight locomotive facilities in total.

Unlike KTZ's current system, locomotives would not be listed as assets on the books of specific terminals but would be recorded as system assets. A general purpose locomotive could operate anywhere over the KTZ network. Schedules, maintenance and inspections can be designed to maximize the use of locomotives and increase the overall productivity of the fleet substantially.

Locomotive driver on- and off-duty points can be located as needed, given train schedules and working time limitations and need not be co-located with depots. Locomotive drivers would be scheduled over given territories without regard to the specific locomotive assignment. The locomotive and driver management program is associated with several reform program elements:

- Development of a new operating plan,
- Implementation of new dispatching and traffic management centers,
- Implementation of new information systems, and
- Identification of 27-30 of KTZ's 35-crew and locomotive depots for privatization or closure.

Each of these elements is projected to be in place by 2002. Only a short time is needed to implement a locomotive operations and maintenance scheduling process. Implementation of



this program is expected to increase locomotive productivity substantially and could have a similar impact on driver productivity. Additional locomotive productivity enhancements are expected to be derived from replacement of diesel locomotives with new or substantially rebuilt units between 2002 and 2004 and between 2008 and 2008. Electric locomotives are replaced beginning in 2012. The productivity improvement of diesel locomotives is expected to

be greater than for electric locomotives after 2003, because more new high-productivity diesel locomotives are introduced into the KTZ fleet and because a greater proportion of the electric fleet is expected to be used in passenger services. To summarize, productivity enhancements are expected to be derived from each element of an integrated reform program—change in management methods, investment in new locomotives and restructuring and privatization or closure of excess depots (and elimination of excess locomotive fleet). Traffic growth will also contribute to increased locomotive productivity.

4.4 Restructuring KTZ Internal Units

KTZ traffic has declined substantially since 1990—1998 traffic is about one-third 1990 traffic. The traffic decline has resulted in an excess of assets and staff. While KTZ has made some staffing reductions—staff numbers appear to have declined by about 12 percent—personnel reductions have not approached the level of traffic decline. KTZ staff productivity has dropped precipitously.

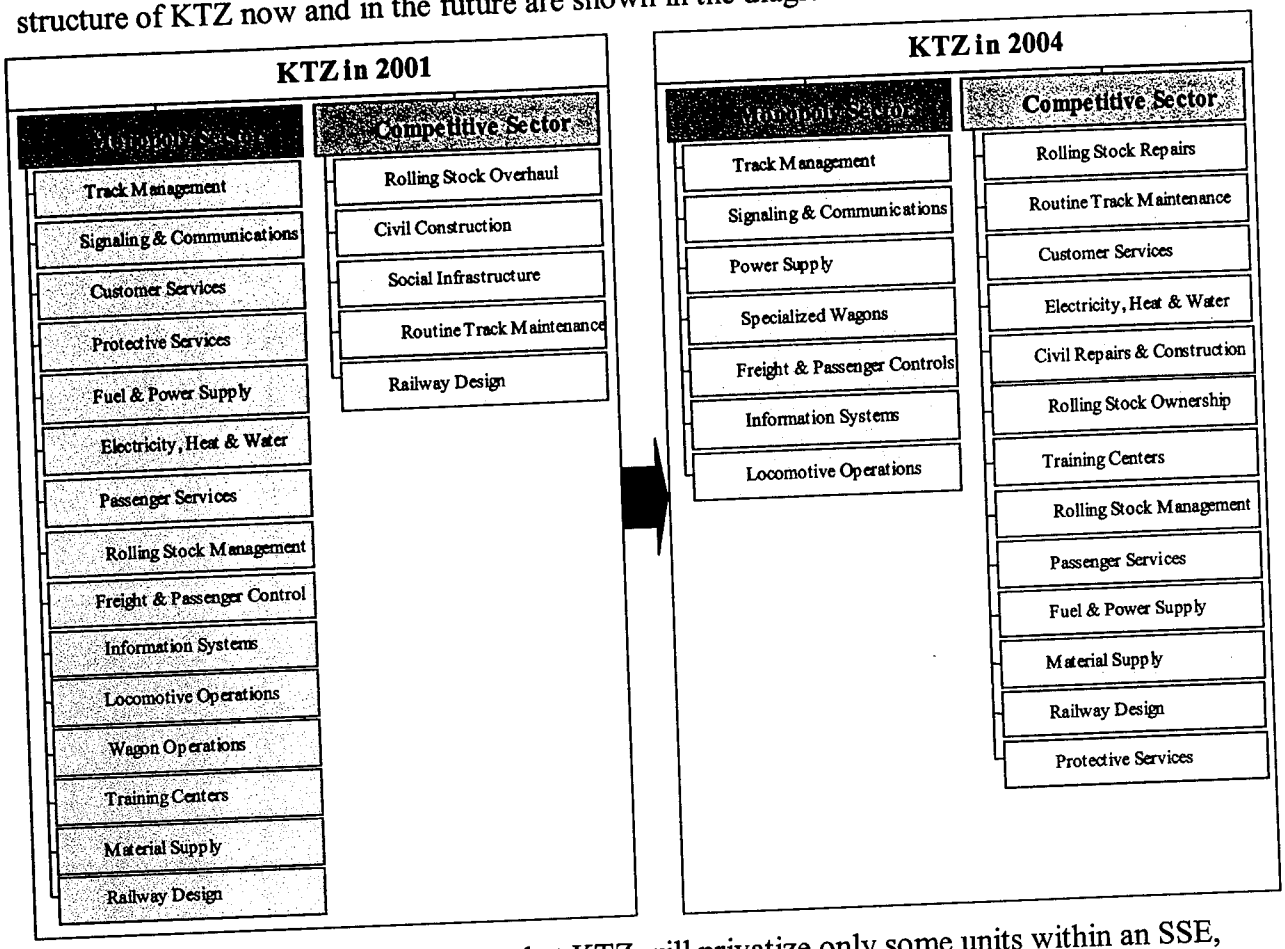
KTZ plans to make significant changes in its organization structure and staffing levels over the next two years. Over the past few years, KTZ has been forming Subsidiary State Enterprises from local KTZ enterprises. These have included:

- **Passenger Traffic SSE**—passenger services, not including depot-based services such as laundry, wood shops, and coach depots.
- **Special Paramilitary Guards SSE**—security services
- **Center for Specialized Transport Services SSE**—Customer Services, waybilling, warehousing, forwarding, container operations
- **Zheldorstroi SSE**—water, heating, and sewerage units, some construction and concrete sleeper manufacturing
- **Remput SSE**—crushed stone, track maintenance activities
- **Zheldorremmash SSE**—wagon depots, locomotive depots
- **Rail Welding Trains SSE**—rail welding capabilities
- **Transtelekom SSE**—some telecommunications services
- **Kazgiprozheldortrans Institute SSE**—railway design and research institute

It is our understanding that KTZ management plans to privatize some of these functions slowly over an undetermined timeframe. KTZ management assumes that some railway functions, activities and assets can only be supplied efficiently by a single provider, a monopoly. These monopoly functions, assets, and activities are retained within the KTZ organization, which continues to be a state-owned enterprise. KTZ management assumes that other functions, activities and assets can be provided on a competitive basis by outside contractors or internal service providers. These are the functions, activities, and assets that are being moved into subsidiary state enterprise organizations within the KTZ structure.

KTZ management believes it has the authority to form SSE's but not to privatize them. Discussions with KTZ management indicated that they intend to move some units within these subsidiaries into the private sector over an 8 to 10 year time-period. Plans for this transition are vague at the moment. Some KTZ managers talk of transitioning these units to the state property committee for disposal. Disposal may occur through formation of another state-owned enterprise or through privatization. In such cases, KTZ would not benefit from any funds raised by privatization but would benefit from elimination of the expenses associated with maintaining excess capabilities represented by these units. Apparently, it is currently thought that the rate at

which units and departments can be moved into the private sector depends upon the ability of KTZ to develop non-rail activities for these units to pursue. The monopoly-versus-competitive structure of KTZ now and in the future are shown in the diagram below:



Some in KTZ management indicate that KTZ will privatize only some units within an SSE, including the assets assigned to the unit, but will maintain a KTZ capability in most units to "keep contractors honest". Others say that KTZ will exit all activities within the competitive sector and retain no associated assets.

KTZ is said to have authority from Government to reduce employment by 40,000 this year and 20,000 next year through this restructuring. The Human Resources department confirmed that KTZ has never transferred a unit to the State Property Committee, nor has it privatized any units. The consulting team believes that some of the proposed restructuring will strengthen KZT and the rail industry in Kazakhstan. Other elements of currently planned restructuring should be modified or changed since they either separate essential elements of rail service delivery or unnecessarily limit the flexibility of the privatized or separated units.

Some of the organizational changes planned by KTZ appear to be the equivalent of forming business units. The SSE's appear to have profit and loss responsibility but not investment autonomy. This is a reasonable first step, but KTZ should move rapidly to divest non-productive or unneeded activities and assets as quickly as possible. Privatization or sale of business-units should be a reasonable way for KTZ to exit those functions. In many cases, KTZ might be able privatize a business unit with a contract for 25 percent to 50 percent of its capacity, enhancing the privatization prospects of the business unit.

KTZ should take care not to create a supplier monopoly with whom it must do business. For example, it should not put all major track renewal functions and assets into a single entity with whom KTZ *must* contract to perform track renewals. To prevent such concentration, KTZ should seek a non-consolidation agreement as a condition of any separation, sale or privatization. This agreement would, for example, prevent all wagon workshops from consolidating into a single supplier for maintenance, overhaul and new wagon construction. The relatively small size of the Kazakhstan rail industry may not support multiple suppliers in some activities. In such cases, KTZ should still consider outsourcing many functions to companies with interests across multiple sectors of the economy. For example, a civil construction firm can build factories, commercial facilities and railway buildings. A locomotive workshop could repair locomotives for KTZ and industrial railways, as well as repair stationary power supplies and heavy electrical machinery.

Some of KTZ's views about which assets, services, and functions can provided by a competitive private sector reflect the current situation within Kazakhstan rather than the real capabilities of private markets. To be sure, KTZ must take care to develop competitive markets as it restructures. To do that, a KTZ management reform team should review rail and rail supply markets in more mature market economies. The team should travel to market economies to view and discuss industry structural issues. It should meet with railway supply companies to determine how they are structured, who owns equipment used in their work, and how contractual relationships are structured. It should also meet with railway finance companies and asset owners to review how they are structured, how the markets work, contract forms, and develop an understanding of their customers (many of whom are shippers, not railways).

In developing the financial analysis of KTZ for the proposed EBRD financing of track maintenance equipment, the consultants have assumed the restructuring is possible and that privatization can proceed relatively quickly. We have also assumed that KTZ will not benefit from the proceeds of such privatizations. Major units we assumed would be privatized include passenger services, track renewals, civil construction units, major wagon and locomotive workshops, security services, and the many non-transport services now conducted by KTZ. We have assumed that the privatization process begins in 2001 with the Passenger Services unit. We have assumed that the passenger services unit is privatized with its own locomotives, coaches and associated workshops. Separation and privatization of other units is complete by 2003.

The privatization process results in the separation of more than 50,000 staff from KTZ,[63] although some 20,000 of these are still employed in the rail industry (as suppliers to the railway) in 2003. Passenger Services contains the most significant block of transferred employees. KTZ purchases services and materials from some privatized units, but such services are assumed to be produced more efficiently and at lower cost than KTZ's current costs. KTZ also purchases only the services it requires. This results in a transfer of former KTZ railway employees outside the rail industry. Total rail industry employment goes from about 137,000 in 1999 to about 65,000 by 2003. (KTZ total employment is about 152,000 which includes about 15,000 employees currently providing non-transport services) Our analysis assumes no restriction or cost associated with such transfers, though alternative assumptions regarding personnel costs during restructuring are analyzed in Chapter V.

[63] Well within the 60,000 staff reduction KTZ management claims it has discussed with the Government.

Observations about the restructuring and re-organization of major KTZ assets, functions and departments are discussed in the following sections. Within each section, we also describe the assumptions made in developing the financial analysis.

4.4.1 Passenger Services Restructuring

The most difficult business unit to separate from KTZ will be Passenger Services. KTZ's passenger services are currently loss making and are projected to remain so throughout the planning period. Some passenger services require significant investment in the form of new coaches, a new coach repair and overhaul shop and new locomotives. Such investments are difficult to justify unless Government provides financial support (or direct financing). We have not assumed significant investment in suburban services.

KTZ formed a Passenger Services Unit in 1999. Currently, the unit is responsible for planning and managing passenger services. As a part of the reform process, we have assumed that the Passenger Services Unit becomes responsible for its own rolling stock (coaches, baggage and mail wagons, and locomotives) and its repair. It is also responsible for station and on-board staffing. We have also assumed that the Passenger Services Unit is separated from KTZ at the end of 2000 (including its locomotives and coaches, and responsibility for drivers and repair staff).

As it readies the unit for separation, we have assumed that KTZ takes action to reduce the operating losses associated with passenger services by reducing costs, actions that KTZ has already begun. As discussed in Chapter III (Marketing and Analysis), depressed economic conditions and KTZ's continuing efforts to reduce lightly used suburban services results in some decline in passenger patronage over the next few years. Coupled with the cost reduction efforts, passenger service related losses are reduced. In 2001, passenger services are separated from KTZ and assumed to be privatized. KTZ losses from the operation of passenger services ends at that time. Losses in 2001 are estimated at about 4,500-million Tenge. Under the proposed reform programs, losses decline to about 1,500-million Tenge by 2004 before increasing again with increasing traffic (traffic increases are driven by economic growth).

The KTZ Reform Plan is not dependent upon how Passenger Services are separated or privatized. We have assumed here that passenger services will be privatized in one or more concessions. To estimate the level of track and infrastructure charges KTZ earns from passenger services, we have assumed that private operators increase prices and continue to reduce non-remunerative services to minimize subsidy requirements. We have also assumed that passenger-service companies continue to negotiate with national and local governments for operating and capital subsidy.

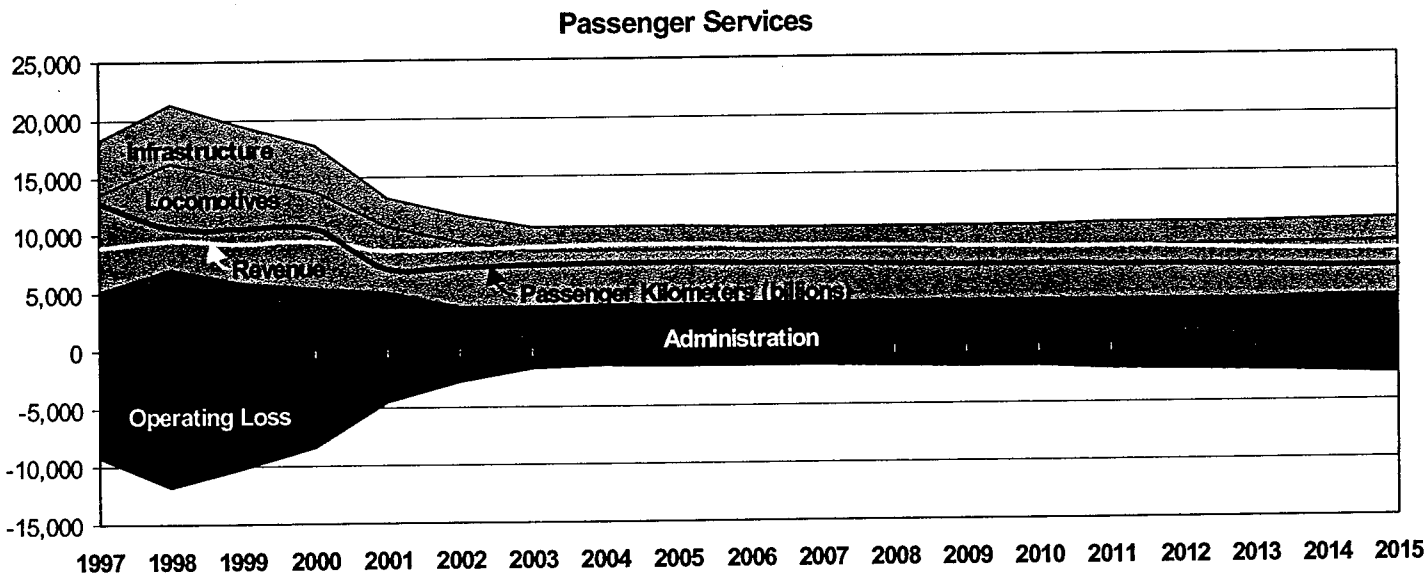
These new arrangements are projected to result in increased passenger fares and reductions of the most cost-inefficient services. Passenger-kilometers decline by about 30 percent by 2003. KTZ continues to provide track access for the passenger services at a cost-based price but is not responsible for cross-subsidizing passenger operations.

The decline in passenger services will affect KTZ in several ways. First, more small stations will be closed. Station personnel productivity will increase commensurately, reflecting that smaller and less used stations will be closed. Finally, part of the reform process will be to restructure on-board coach staff and coach maintenance depots. The consolidation will improve the productivity

of on-coach staff by 10 percent per year for 4 years (35 percent in total). Coach depot staff productivity, for catering, and minor repairs and servicing will increase by a like amount. KTZ staffing is reduced by some 15,000 in 2001 as responsibility for passenger services and assets is transferred to new entities (passenger related employment in 2001 is about 15,000). The privatization process is assumed to drive continued gains in productivity, and reductions in service to minimize the Government subsidy required. By 2003, passenger related employment is assumed to be reduced to about 9,000. Real wages are assumed to increase by some 13 percent over the same period to reflect increasing productivity and higher service expectations from employees.

Privatization eliminates KTZ's passenger service related losses. Overall, productivity programs in Passenger Services result in a reduction of losses related to passenger operations from an estimated 10.2 billion Tenge in 1998 to about 1.7 billion Tenge by 2003.

KTZ has entered into loan agreements for new passenger rolling stock and a new coach maintenance facility in Almaty (German and Japanese loans). We have assumed that the debt for these projects remain on KTZ's books and debt service is included in track access charges levied on passenger service operators. It is possible that different arrangements may be made (*e.g.*, the new rolling stock and workshops could be included in the concession arrangement and any subsidies required for passenger services would include debt service).



The privatization process may require continuing subsidy from KTZ in the form of reduced infrastructure charges. To determine the level of such subsidies, KTZ must develop a detailed cost accounting system and reach agreement with government and the new Passenger Service entities on the form and structure of infrastructure charges. There is considerable precedence for such contracts and well developed cost accounting systems available for implementation in the short-term. In addition, the form of privatization suggested here is common and there are many examples to choose from in developing the concessioning process.

4.4.2 Restructure the Special Paramilitary Guards

KTZ has a staff of paramilitary guards who provide security for strategic rail facilities including bridges, tunnels, stations, depots and other facilities. Currently there are 22 such units throughout

the KTZ network. As a part of the restructuring, KTZ plans to form the special paramilitary guards into a Subsidiary State Enterprise and establish transfer pricing between the SSE and KTZ. In addition, we have assumed that KTZ will review the list of strategic facilities requiring guards with the view to reducing their number. The number of strategic facilities will be reduced as a part of the asset reduction program, and as a part of other restructuring actions (such as reduction in the number of passenger stations and transfer of social facilities).[64]

Guard staffing is related to the number of facilities, the extent of KTZ's network, and the number of stations remaining open. The number of special paramilitary guards required is reduced as excess assets are eliminated and other portions of the reform process take place (*e.g.*, the new operating plan reduces the number of major marshalling yards and lines and facilities are transferred to customers). Since only the smallest facilities are eliminated, the number of guards and per facility is projected to increase by some 25 percent. These actions reduce required security staffing from some 8,500 in 1995 to about 2,200 in 2003.

KTZ has discussed the transfer of paramilitary guard units to the Interior Ministry and purchase any necessary security services from them. KTZ has many options for these forces including privatization, transfer to another Ministry, or to local police units. We have assumed that paramilitary guard functions will be privatized in 2003 (private security firms generally are more efficient than government units). In our financial analysis we assumed that about 2,100 employees are transferred out of KTZ at that time. KTZ purchases security services as necessary on a bid/contract basis. We have assumed a 25 percent cost reduction stemming from the privatization and bid process. To reflect the increasing productivity expected from the paramilitary guard units, real wages are expected to increase by about 13percent by 2003.

4.4.3 Restructuring the Wagon Department

The Wagon Department restructuring program is composed of several steps. KTZ plans to separate wagon maintenance and operating functions starting in 1999. In this process, depot maintenance functions, buildings and wheel workshops will be transferred from the Wagon Department to Zheldorremmash SSE, KTZ's wagon building subsidiary. Common freight wagons and the responsibility for operating inspections and minor work (*e.g.*, break shoe replacements) will remain within KTZ's Wagon Department. KTZ plans discuss a slow divestiture or privatization of the Freight Wagon Depots transferred to Zheldorremmash SSE, though there are no details. Smaller, little used facilities will be closed in the transfer process. As a part of this program, excess wagons will be retired or eliminated (see 4.2.4 above).

Transfer of specialized wagons to third parties (not to the Zheldorremmash SSE) for operation as specialized services is discussed within the KTZ restructuring program. Specialized wagons include refrigerated wagons, container carrying wagons, and others. Specialized wagons are to be divested from KTZ over time (between 2000 and 2003).[65] Third-party owner/operators of these wagons will contract for their use directly with customers, so their ownership and maintenance costs will be borne by the third-party owners or by shippers directly. It is anticipated that depots for these specialized wagons would be divested as well.

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[64] See: *Restructuring Programme: Programme of Restructuring "Kazakhstan Temir Zholy" Republican State Enterprise* Produced by KTZ, Astana, 1998. Page 11.

[65] *ibid*, pages 7,8.

For the financial analysis, no changes in wagon ownership were assumed.[66] The financial impact of transfer of ownership of wagons was considered a wash—tariff reductions would equal ownership cost changes. We did, however, assume that KTZ would centralize wagon distribution and management and consolidate wagon maintenance activities into a few depots. The remaining depots are assumed to be separated from KTZ, first in the Zheldorremmash SSE, then outside KTZ either through privatization or closure.

In our Financial Analysis, we assumed that about 7,000 excess wagons would be eliminated from KTZ's fleet by 2003. This continues a program that has brought KTZ's wagon fleet to about 91,000 wagons in 1998 from 105,000 wagons in 1996. As a part of this effort, the percent of KTZ wagon fleet reported out-of-service would decline by half (from 30 to 15 percent) and the active fleet is expected to remain constant about 65,000 wagons.

Under the restructuring program, KTZ staff would be reduced by about 6,700 (to about 9,000) between 1999 and 2002. The staff reduction is driven by closure of small wagon depots and the reduction in the number of wagons in KTZ's fleet. Although many wagon depot personnel are to be transferred to Zheldorremash SSE, because it is a subsidiary of KTZ, total KTZ staffing is not affected until wagon workshops are privatized. Elimination of small and unproductive depots will result in an overall increase in the productivity of remaining wagon maintenance staff. A 40 percent improvement in staff productivity is assumed in the financial analysis as smaller facilities are closed and larger facilities, with greater economies of scale, remain. This productivity assumption does not work to further reduce staff levels, but rather reflects the productivity anticipated in larger maintenance depots.

We have assumed that most wagon workshops, especially those involved in wagon rebuilding and overhaul, are privatized in 2003. The privatization transfers some 2,700 employees out of KTZ's employment ranks and into several private wagon maintenance, repair and overhaul companies. KTZ controlled wagon depots are reduced to less than eight. KTZ contracts for overhaul and major repair work from the privatized workshops on a tender basis. Competition for KTZ tenders is expected to reduce KTZ costs for these functions by some 25 percent. To reflect the increasing specialization and productivity of railway wagon industry workers, wages were projected to increase, in real terms, by about 13.5 percent by 2003.

We believe that privatizing ownership of railway rolling stock is a good idea that KTZ should try to implement. If an equipment leasing and financing market can be developed in Kazakhstan, KTZ can finance new equipment, and raise capital for rebuilding rolling stock through sale-and-leaseback financing. An equipment leasing industry is unlikely to develop in Kazakhstan unless significant tariff discounts are offered when customers supply equipment. When customers are struggling to pay cash for transport services, their ability to finance wagon assets is questionable. Financing from EBRD, World Bank, a cash rich customer, or other sources may help develop such a market.

4.4.4 Restructuring the Locomotive Department

KTZ's locomotive fleet is set to shrink considerably over the next few years. Fleet reductions will arise from several sources:

[66] An assumption regarding ownership transfer would necessitate a corresponding assumption about changes in freight tariffs to reflect the changes in ownership and maintenance responsibilities. We did not undertake this analysis, as much of the necessary information was not available.

- Sharp decline in traffic since 1990, slow projected growth in freight traffic (at least relative to the pace of the decline), and a significant future reduction in passenger transport;
- Improved utilization provided by centralized fleet management practices and new operating plan (discussed in Section 4.3.2);
- Improved utilization and fleet flexibility provided by separation of locomotive assignment from driver management (discussed in Section 4.3.3); and
- The acquisition of new (or rebuilt) locomotives (see Section 4.5.3) with improved reliability and reduced maintenance requirements.

These factors together reduce KTZ's required locomotive fleet (and that of any passenger operators) from 2,675 units in 1996 to 610 by 2004. The task of the locomotive department will be reduced substantially. Parts of the fleet will require overhaul, and new locomotives can be assembled in workshops in Kazakhstan. As with wagon workshops, KTZ plans to transfer locomotive repair facilities to Zheldorremmash SSE in 1999.[67] Some privatization of these facilities may take place in the longer term. We believe these changes are insufficient.

With the significant reduction in fleet and workload, the locomotive department should be restructured. Maintenance and repair activities should increasingly focus on component repair and change-out, with some of this work contracted out to privatized facilities. We believe that KTZ need retain one diesel and one electric locomotive workshop. The remaining facilities should be eliminated—some privatized and the rest closed or sold for other purposes. (Kazakhstan does not generate enough railway work to keep all existing depots). We have projected staffing required for locomotives (including drivers and passenger services) to be reduced from more than 33,000 in 1996 to about 11,000 in 2003.[68] Of this amount, KTZ activities are expected to require some 6,000 locomotive department staff and passenger services about 2,500. The remaining staff are in private facilities.

KTZ should reorganize the locomotive department, separating driver and locomotive operating management from locomotive maintenance activities. Drivers and driver management activities should be conducted in the operations centers and coordinated with train services. Locomotive management activities should also be conducted in the operations centers and coordinated with train services. Locomotive management functions should be responsible for ensuring that appropriate locomotives are assigned to train operations and that locomotive units receive the required maintenance. A maintenance department should be responsible for managing inspection, maintenance, rebuilding and servicing activities. Locomotive assets should be carried on the books of KTZ as a whole, rather that those of individual depots. Depots, workshops, locomotive management and crew management centers should be managed as cost centers.

4.4.5 Restructuring Track Department Activities

KTZ plans to separate basic track maintenance and inspection from track renewal work. Basic inspection and maintenance will continue to be a part of the KTZ track department, renewal functions will be moved into Remput, SSE. Some crushed stone factories have already been

[67] See: *Restructuring Programme: Programme of Restructuring "Kazakhstan Temir Zholy" Republican State Enterprise* Produced by KTZ, Astana, 1998. Page 10, item 5, Zheldorremmash SSE

[68] Locomotive drivers, though separated from locomotive maintenance activities, are still included in Locomotive Department staffing numbers.

transferred into Remput. KTZ's restructuring plans discuss the possibility for eventual privatization of some Remput functions by state authorities. To rationalize track maintenance practices, KTZ would consolidate some 25 Track Machinery Stations (TMSs) into 9 regional mobile units, which would be transferred to Remput. In the process, smaller TMS would be eliminated and excess machines written-off. We believe KTZ's plans for restructuring track and structures maintenance are a good start but should be progressed faster; privatization should become an explicit part of the reform program.

The elimination of excess assets is expected to result in the reduction of light density lines and station and yard track[69] of about 7,300 track-kilometers (out of a 1998 total of 26,900 track-kilometers). The consolidation of TMS work groups will generate some improvements in employee productivity. The proposed investment program includes substantial equipment to mechanize track maintenance practices, prolong material life, and improve infrastructure maintenance management.

The effect of these programs will be to transform track and infrastructure maintenance activities. Together, the programs will reduce track maintenance requirements, increase the life of track materials, improve the management of maintenance work—ensuring that maintenance and renewal activities are performed at the most critical places—and improve employee productivity substantially. The consolidation of TMS groups is expected to improve the productivity of renewals forces. Consolidation of basic maintenance forces, in association with the elimination of the lightest density lines, is expected to improve productivity of normal track maintenance work. Track machinery investments will also increase employee productivity.

As with other departments, the consulting team believes KTZ can and should move more quickly to separate heavy track maintenance forces from KTZ (and Remput). We presume that such separation would take the form of privatization of work groups, including equipment and associated depot facilities. KTZ must take some care to ensure that work groups of sustainable size and equipment are formed but that a *single* track maintenance contractor is not established. Privatized units should be large enough to be able to lease, rent or purchase new equipment, but KTZ should ensure that there is competition for track maintenance tenders. In the financial analysis, we have assumed that KTZ will privatize heavy track maintenance activities by the end of 2002 and will tender for such work in 2003. We have assumed that privatization and the tendering process will increase the productivity of the work tendered.

We have also assumed that the new track maintenance equipment investments will change track maintenance practices and increase the capabilities of KTZ's own basic maintenance forces, reducing the amount of renewals work that must be done. Over time, the new equipment investments also add significantly to material life, requiring less material inputs. It should be noted that the initial investment in track maintenance equipment (to be financed by the EBRD) provides enough equipment for about one-third of the railway. Additional investments are included in the Revised Reform Plan's capital spending program to mechanize track maintenance across the network.

[69] *ibid*, page 7. The discussion of changes in transport calls for the transfer of responsibility for "access lines", smaller marshalling yards, and some station trackage.

Station based loading and unloading services, including the extensive network of gantry cranes and materials handling facilities at stations, especially smaller stations, can and should be disposed of or privatized. KTZ should conduct a series of studies to determine what facilities are used and valued by customers and either retain those or sell (rent, lease) them to customers. Some stations may have customers who would value bulk distribution terminal technology (where liquid and other bulk goods can be stored for distribution to customer factories). KTZ should review commodities handled at major stations to determine the utility of such facilities and, where appropriate, enter into contract agreements with customers to upgrade or modify those facilities. Other facilities are little used, and would not attract buyers a privatization. These should be dismantled and sold for scrap, and the facilities closed.

The clerical and customer contact functions of CSTS represent the most direct relationships that KTZ will have with its customers. These functions—billing, customer service, collections, wagon distribution, train planning, and service delivery—should be retained within the KTZ structure. New computer systems will automate the task of billing and order-entry. The three operations centers, discussed above, should become the focus for customer service centers that provide these essential functions. Here, clerical staff, aided by new information system hardware and software, deal directly with customer orders for service and manage equipment and train services necessary to provide those services. This activity is vital to profitable marketing and management of rail services and should not be outsourced or privatized. Besides, it is not capital intensive and provides KTZ with unique insights and close contact with its shippers. These functions are the essence of how a commercially oriented railway should be interacting with customers, developing an understanding of their needs, and designing service packages and pricing that satisfies those needs. The customer service centers should become the collection place for data on rail customers and service needs and the focus of efforts to develop service contracts outside the normal railway tariff structure.

We have assumed that the restructuring, station closure, light density line closure, new operating plan and information systems work, along with the elimination of station materials handling facilities will be implemented starting in 2002. The changes are reflected in the financial model by allowing the reduction of small stations to reduce station employees. At the same time, the productivity of station related staff is increased as clerical functions are centralized into customer service centers, small stations are closed (leaving larger stations with traditionally higher productivity), and materials handling functions are closed or privatized. Average haul of all domestic transport is reduced by 2 percent, and by 1 percent for import/export freight traffic, to reflect the elimination of light density branch lines and smaller yards. Also, to reflect the elimination of these light density operations from KTZ operating responsibility, tonnes-per-train is increased by 2 percent and the productivity of drivers and guards is increased (as measured by train-kilometers per driver—in the locomotive department). We have assumed that wages increase by 13 percent between 1999 and 2003 to reflect the increased productivity expected from freight and commercial operations.

Staffing for Commercial and Freight Services (both CSTS and Transport groups) declines from 17,800 in 1998 to about 8,100 by 2003. Depreciation charges are reduced, reflecting the reduction in facilities and assets, related expenses also decline.

4.4.7 Restructuring Civil Construction Units

In the past, Civil Construction units included many non-transport functions. These units were reported to employ some 12,500 staff. In 1998 KTZ separated non-transport related functions from transport related civil works. Transport related civil units, remaining within KTZ now total about 4,000 staff. The units have depots and facilities used in their work. These units do not require rail industry specific skills or equipment and perform common civil construction units. KTZ intends to separate these units from the core railway and eventually privatize them.

We have assumed that civil construction work can be purchased on a tender basis. We think KTZ should separate civil construction units and privatize them as quickly as possible. To the extent possible, units should be privatized such that none have a monopoly position in any specific skill or asset that may be required for KTZ work. In the financial analysis, Civil units are separated from KTZ in 2003 and KTZ purchases any civil construction services on a tender basis. Given the competitive market expected for such services, we have assumed that KTZ costs related to the completion of civil works declines by 25percent. KTZ retains some 200 staff to conduct tendering processes, engineering, inspection and management of civil contractors.

4.4.8 Restructuring Non Transport Units

Significant restructuring is expected in social facilities units within KTZ. Social facilities units have housing, hostels, administrative and technical buildings, culture clubs, sports facilities, children's camps, sanatoriums, and similar assets on their books. It is our understanding that they are responsible for maintaining and operating those facilities until they are transferred to local authorities, or to regional state property committees for further privatization. KTZ intends to move these functions to Zheldorstroi, SSE and to move them to local communities or other governmental units by 2000.

KTZ also intends to restructure the management, maintenance and ownership of water and heating supply, sewerage units, boiler houses, and other similar facilities. The plans are to eventually transfer the ownership of these facilities where they are not integrated with core railway operations.[70]

KTZ has other non-transport units, in Agribusiness, non-rail production facilities and similar activities. Total employment in non-transport related units was about 15,000 in 1998.

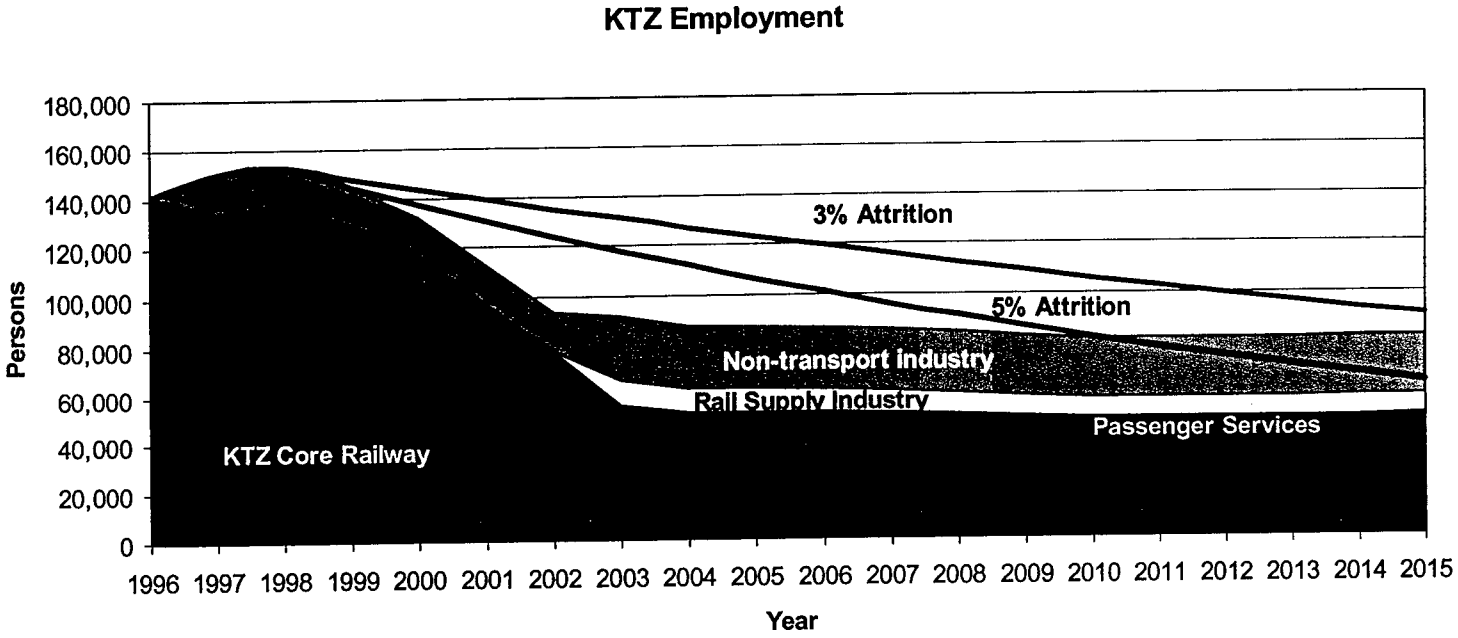
We agree with KTZ's plans to transfer, close, privatize or otherwise exit these businesses in the near future. In the financial analysis, we have assumed that all such units are transferred from KTZ responsibility by the end of 2003. We have assumed that KTZ will dispose even of units for which it may require services in the future (say for heating at workshops or other KTZ retained facilities). KTZ will retain some 250 staff to manage and oversee KTZ's needs for these services and manage and oversee tendering processes and contracts.

4.4.9 Restructuring Summary

The restructuring program will result in significant reductions in KTZ staffing and costs. Many personnel will be moved from KTZ supervised units into private entities or other governmental units. Some of these workers will be continue to work in the rail industry, but now as suppliers to

[70] *ibid*, pages 10 and 11

KTZ (or other privatized units). Total KTZ staffing will move from the 152,000 in 1998 to about 46,000 by the end of 2003. In addition to these 46,000, some 19,000 staff will continue to be employed in the rail industry as operators of passenger services, suppliers to KTZ, operators of access lines and customer service facilities. More may be employed in the rail industry if contractors serving industrial and customer operated railways are counted. Rail supply units separated from KTZ will no doubt seek to serve a wider range of rail clients and provide services that have not been available in Kazakhstan before. The chart below shows total KTZ core



railway employment and employment of former KTZ staff in passenger services, private units that supply services and goods to KTZ, and those transferred from KTZ to non-transport functions. The chart shows KTZ core railway employment was about 137,000 in 1998; about 15,000 staff were performing non-transport related functions. By 2003, rail industry related to KTZ employment will total some 65,000 employees. Of this amount, about 9,000 will be providing passenger services, 10,000 will be supplying services and products to KTZ, 46,000 will be directly employed by KTZ. Some 26,000 employees will have moved with non-transport enterprises and functions that KTZ has exited over the five year period.

The restructuring plan calls for significant reductions in employment. The disposition of these employees is often a difficult issue for railways and governments undertaking restructuring. Many railways have offered early retirement as well as special severance arrangements[71] to induce employees to depart. Such programs can be expensive but are usually effective in reducing employment. The two lines show where employment would be with attrition rates of 3 and 5 percent and assuming no new hiring. KTZ has experienced very high attrition rates in the past (as high as 13 percent reported by Human Resources Department), currently attrition is reported at about 9 percent per year. Using lower attrition rates recognizes that some new employees will need to be hired to fulfill the new and changing requirements of KTZ. It also reflects the experience of most railways that if a special severance program is offered, voluntary employee attrition will slow.

[71] Severance arrangements can include financial inducements such as a lump-sum payment of a certain percentage of salary as well as training programs, transfer of housing units, education allotments and other benefits.

Based upon these assumptions, KTZ or the government would have to provide special severance packages to between 30,000 and 40,000 employees. The program would be substantially over by 2003 (after that year, the rate of change in employees is less than the attrition rate).

While these are significant employment reductions, they are not unprecedented in government-railway reform processes. Unproductive employees will be released to join the economy and create greater economic value. If severance payments are significant, KTZ and the government must determine how such a program might be financed. If the severance program thought of as an investment program (similar to purchasing a machine to reduce labor costs), a one-year payback period would normally be considered a good financial return. On this basis (one year salary for early departure), a severance a program could cost as much as US$30 million to US$40 million and still have a high return.

Employee reduction programs can be financed by international financial institutions, using the businesses to be privatized as collateral to secure a loan. International financial institutions, such as the World Bank, have a great deal of experience in how to manage these kinds of employee reduction programs and are often willing to help finance them.

4.5 Investment Program

The KTZ prepared Investment Plan[72] proposes investments of some US$1.6 billion over the next five years. We propose a smaller investment plan for the first five years and a somewhat larger one in the latter period of the plan. The KTZ and Revised investment program are shown in the chart below. As a check of the reasonableness of the proposed investment programs, depreciation (on an estimated replacement cost basis) averages less than US$150 million per year after 2003.

Investment Program (US$000,000)	**1999-2004**		**2005-2015**
Element	**KTZ Plan**	**Revised Plan**	**Revised Plan**
Renewals and Strengthening	$ 690	$ 550	$ 1,320
Locomotive Fleet	480	150	500
Track Machinery	100	70	120
Wagon Fleet	90	38	806
New Line Construction	70		76
Signal & Communications	30	46	
Rolling stock Depots	50	39	0
Information Systems	25	25	
Other	76		
Total	**$ 1,611**	**$ 918**	**$ 2,822**
annual average	**$ 322**	**$ 183**	**$ 257**

4.5.1 Fixed Asset Renewals

Fixed asset renewals constitute the largest portion of the investment program (about US$ 120 million per year). Spending for fixed asset renewal includes US$ 60 million annually for track, US$ 30 million for bridges and artificial structures and about US$20 million for all other asset renewals. The costs associated with track renewals and strengthening are shown here to compare

[72] *KTZ Investment Programme for 1999-2003*, Draft prepared 19 December 1998, Astana

with the KTZ plan, but in the financial analysis done for this plan, track renewal (about US$ 60 million annually) is treated as an expense.[73] Note that the KTZ US$ 690 million program included about US$90 million for renewing and strengthening the line from Druzhba to Presnogorsk via Aktogay, Mointy and Astana. While this line may become an important international corridor, traffic levels on large portions of it are quite low and the line does not require rebuilding with new materials at this time. Except for this investment, the renewal plan proposed here is similar to that in the KTZ prepared plan.

4.5.2 Track Maintenance Equipment:

In the proposed plan, KTZ acquires US$ 60 million of new track maintenance equipment over the three-year period from 2000 to 2002. The equipment includes the following major elements:

Purpose	Equipment	No of Units	US$ (000)
Automated Surfacing Equipment[74]	Ballast Cleaning /Undercutting	3	8,200
	Automated Tamping Machine	3	4,300
	Ballast Regulators	3	3,200
	Dynamic Track Stabilizer	3	4,000
Mechanized Sleeper Replacement	Sleeper Replacement Machine	10	1,800
	Lifting Machines	5	1,400
	Ballast Spreader/Handling Machine	5	700
	Sleeper Tamping Machine	5	1,900
	Power Tools & Machines	40	200
Mechanized Equipment for Light Maintenance Work	Shunter/Generators	7	6,800
	Track Gang Carrier	13	2,500
	Hi-rail Cranes/trucks	5	1,400
	Ballast Spreader/Handling Machine	1	200
	Power Tools & Machines	~1,900	4,300
Track Management Equipment	Geometry Measurement Vehicle	1	1,000
	Rail Grinding Train	1	8,000
	Stationary Head Profile Machine	1	3,000
	Hi-rail Vehicles/motor-car	5	2,000
Other	Various, including contingencies & fees		5,100
Total			**$60,000**

The equipment permits a change in track maintenance methods—component replacement of worn elements of track rather than panel replacement. It also permits a change in how track maintenance is managed. The work and materials put into the track will be based on automated track geometry and rail inspection rather than a time. The equipment also provides for increased mobility and some automation of basic track maintenance forces. Finally, rail grinding and lubrication equipment improves the management and life of rail, an expensive material item. The effect of these investments is to increase the productivity of track maintenance work, including

[73] Many railways expense track renewal spending, treating only new construction work as investment. Often, tax law will determine how such investments must be treated.

[74] This equipment is also listed separately as the major part of a US$28.9 million investment program in KTZ's Investment Plan. See the discussion in Section A1-3 in *Appendix I.*

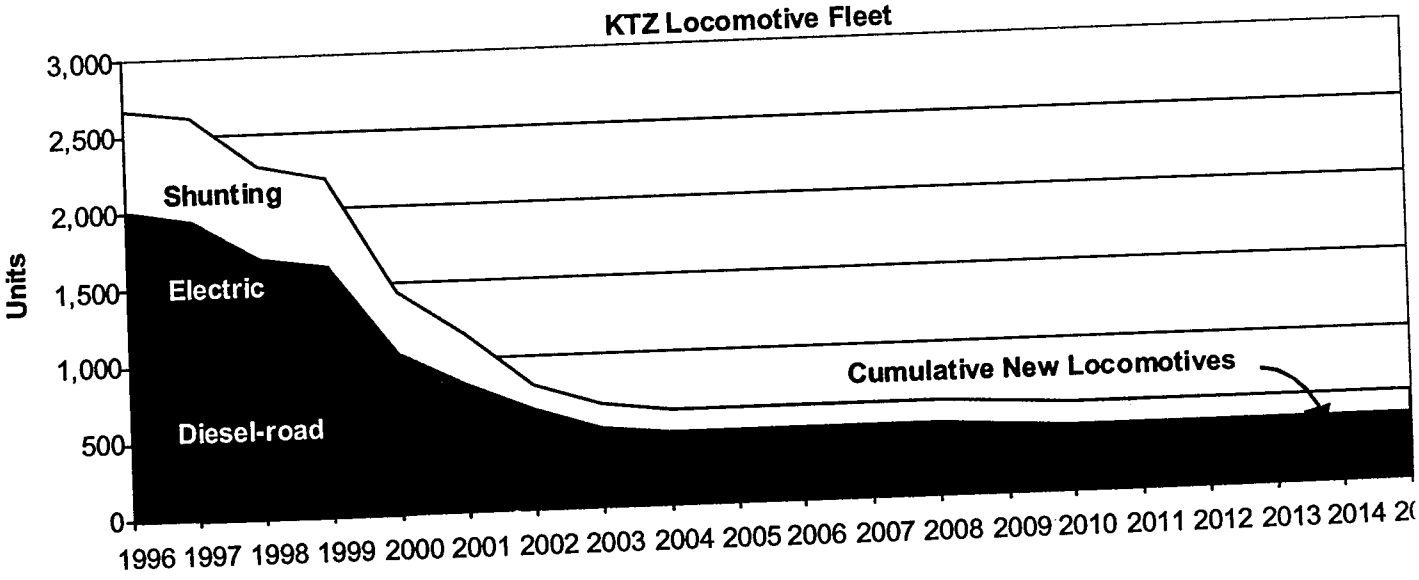
both renewals and basic maintenance. The effectiveness of maintenance work is also improved, reducing overall track maintenance inputs. Finally, improved rail husbandry, better track surface condition and the use of improved track materials (rail fastenings and insulated joints) prolongs the life of the most expensive materials by a factor of two over the period.

The investment program in the Revised Reform Plan assumes that KTZ continues to invest in such equipment. It contains an additional US$120 million in track maintenance equipment over the period from 2004 through 2015. We estimate that this will be sufficient equipment for the entire railway.

4.5.3 Locomotive Acquisition

The investment program includes the acquisition of about 175 new diesel-locomotives and 100 electric locomotives over the 15 year planning period. We have estimated the cost of the diesel-electric locomotives at US$2 million each and of the electrics at US$3 million each. Diesel units are acquired first, with 100 purchased between 2001 and 2004 (75 in the five year period ending in 2003, for a total 1999-2003 investment of US$ 150 million). An additional 75 diesel-electric locomotives are assumed to be acquired between 2008 and 2010. When these acquisitions are complete, the KTZ fleet of diesel-electric road locomotives will be predominantly of modern design (175 new—or rebuilt—units out of about 200).

The investment program also assumes that 100 electric locomotives are acquired. Replacement of the electric locomotive fleet begins in 2010 and runs to the end of the study period. By 2015, the electric fleet will be composed of 100 new locomotives and about 250 existing units. We project that the new diesel-electric fleet will be more productive than the electric fleet primarily because of the maintenance intensity of the bogies and traction systems of existing electric locomotives.



Replacement of its large diesel-electric fleet is one of KTZ's more urgent problems. The existing diesel fleet is unreliable, requires very high maintenance inputs and is not fuel-efficient. Our financial projection assumed that the replacement locomotives are new, but they could be rebuilt from existing KTZ or other locomotives. Rebuilt units would be somewhat less expensive than the new-units, so either additional locomotives could be acquired or less would be spent. In

evaluating its locomotive options, KTZ should consider the full lifecycle cost of the renewed units, including:

- Initial cost
- Fleet size, considering (1) KTZ's ability to capture the value of more powerful units through running fewer, longer trains or trains with fewer locomotives, (2) out of service rates
- Annual maintenance cost, including parts costs, labor and facilities
- Fuel costs
- Technical skills required for maintenance
- Useful life

KTZ has some experience with several rebuilt TE10 units that were re-engined with GE diesel engines. We were informed that the new units are much more reliable and fuel efficient than the units they replaced. KTZ is not happy, however, with the continuing maintenance requirements of the traction systems, which are rebuilt from original components, because the rebuilt traction systems still require frequent inspection and repair. KTZ locomotive mangers said that the re-engined locomotives would require maintenance attention only once every 90-days except for the traction systems, which require attention every 7-days. The re-engined units are said to be about 16 percent more fuel-efficient.

In addition to analyzing rebuild/re-engine programs, KTZ should also consider the acquisition of used third-generation locomotives from either GM-EMD or GE-TSD (SD70-3 or 44C Dash-8s). Such units are relatively young and would be rebuilt and converted to KTZ gauge in KTZ workshops. Modernized second-generation locomotives should also be considered (GM-EMD SD-40-3s, or GE 30C Dash-7s). Many of these units are available on the market at very low prices (a rebuilt SD-40-2 can be purchased for about US$ 500,000 in good condition).

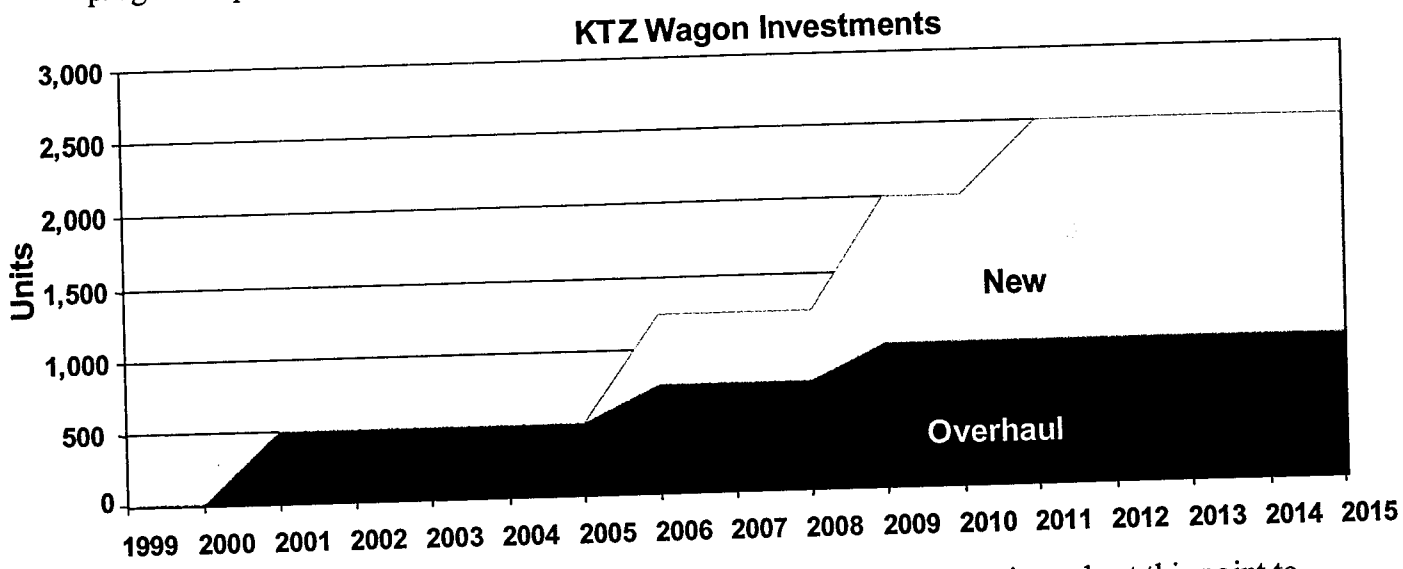
KTZ has performed some analysis of new versus rebuilt units and found that new units would be less expensive to own and operate overall than rebuilt or re-engined locomotives. New locomotives would likely be more fuel-efficient than the re-engined units, and would have greater tractive effort (able to pull larger trains) resulting from improved traction control systems and greater prime-mover power output. This would make the new units capable of significantly greater utilization than KTZ's existing fleet and of rebuilt units. We project that the fleet management program, coupled with the new operating plan, will permit KTZ to more than double the productivity of its locomotive fleet (see the discussion in Section 4.3.3).

The added reliability of the new locomotives enhances the change in locomotive and driver management effort suggested in the restructuring section. Improved reliability and increased standardization of the locomotive fleet allow locomotive units to be scheduled across the KTZ network from origin of movement to destination—only drivers are changed at designated driver change locations. This increases locomotive utilization and allows KTZ to concentrate major locomotive maintenance functions into one location for diesels (probably Chu), and one for electrics (probably Atbasar).

4.5.4 Wagon Fleet Improvements

The restructuring program discussed previously will create substantial change in KTZ's wagon maintenance and overhaul facilities, closing many small facilities and privatizing some of the largest. KTZ's wagon fleet is projected to decline slightly from about 91,000 in 1998 to about 86,000 in 2003. A significant portion of the wagon fleet will require repair, overhaul or replacement during the planning period.

The proposed five year investment program provides US$38 million for major wagon overhauls in the period from 1999 to 2003. We estimate that these funds will provide a US$25,000 overhaul to about 500 wagons per year from 2001 to 2003. The overhaul program is assumed to continue at that same level until 2006 when projected overhauls increase to 750-per-year. Overhauls are projected to climb to 1,000 units a year in 2009 and continue at that level for the remainder of the period. Investment in the overhaul program is expected to be about US$38 million in the first five years and US$ 256 million in the last ten for a total of US$ 294 million over the period to 2015. Initially, overhauls are planned for the tank-wagon fleet, later, as the program expands, it will include other wagon types.



We have also assumed that KTZ will acquire new wagons. No attempt is made at this point to project which wagon types must be acquired. New wagon acquisitions are projected to begin in 2006 when 500 are assumed acquired. New wagon acquisition continues to increase, reaching 1.500 units per year in 2010 and continuing at that level through the rest of the period. New wagons are assumed to cost US$50,000 each. Total new wagon investments in the proposed investment program is US$ 550 million.

One way to reduce the capital expenditure required for wagons is to encourage shippers and other groups to invest in the wagon fleet. As discussed earlier, KTZ would have to offer shippers tariff discounts for providing wagons that are sufficient for the shippers to invest in the equipment.

4.5.5 Rolling Stock Depots

The restructuring process will change the facilities and work requirements of locomotive, wagon and coach departments. Most workshops and depots are expected to be closed or privatized. Rolling stock will be managed differently and most equipment will not be assigned specific workshops for maintenance activities. KTZ will require efficiently designed workshops for locomotive, wagon and coach maintenance.

The investment program in the Revised Reform Plan includes US$ 17 million for the upgrade of major electric locomotive workshops at Atbasar. This investment is also included in KTZ's minimum investment plan. We have also included US$20 million for the upgrade of a diesel-electric workshop. This workshop should be KTZ's only locomotive back-shop. It should be capable of assembling new locomotives, overhauling locomotives (shunting locomotives will

need to be overhauled over the period), and conducting major wreck and other repairs on locomotives. This critical investment is not included in either minimum or maximum KTZ investment plans.

The investment program also provides for completion of the tank-wagon overhaul facility in Atyrau, already underway. KTZ estimates that the minimum investment needed to complete this facility is about US$2 million; about US$11 million has been spent so far. According to KTZ estimates, this facility should be capable of completing overhauls on 500 wagons annually (giving the overhauls an 18 year life, based upon a fleet size of about 11,000 tank wagons). Apparently, KTZ had planned a larger expansion, costing an additional US$15 million, to provide a capacity of 1,200 tank-wagon overhauls per year. KTZ says that these overhauls are not profitable. Given the amount of oil and oil products that are expected to be shipped from the Caspian region over the next decade, we wonder why the overhaul of these wagons is not profitable. This may be another reason for KTZ to develop much more detailed traffic costing models, transport of chemicals, oil and oil products in tank wagons should be some of KTZ's most profitable traffic.

4.5.6 New Lines

KTZ's plans include large investments for new line construction. The maximum investment plan includes what appear to be indicative amounts for four major line extensions—a total of some US$ 1,250 million. Planned extensions are shown in the map below.

The extensions are, for the most part, east-west extensions of the KTZ network. Those included in the KTZ plan include the 620-kilometer line from Arkalyk to Chelkar; a 530-kilometer line

from Chelkar to Bejneau; a 500-kilometer line between Yerlievo to Turkmenbashi in Turkmenistan. Finally, an estimated 100-kilometer connection between Aksu and Konechanaya is proposed in both KTZ minimum and maximum investment plan. There is some indication that these lines may be built with a Japanese loan.

We do not see how these investments can be financially justified. The traffic projections we have developed indicate that there is not sufficient traffic to make these lines viable. If they are, we suggest that a private investment company build them and KTZ pay a usage fee to operate over them. Another alternative is to let the government build them and operate them as a toll road; all operators using them would pay a fee for their use.

The line between Aksu and Konechanaya, costing some US$ 71 million, does promise the potential for generating traffic growth and reducing transport costs for enough traffic to make it a financially viable investment. We understand that KTZ has already begun some work on this line. Given the shortage of cash in the initial five-year projection period, we suggest moving the construction of this line to 2004-2007. By this time, KTZ will have made significant progress in its reform process, its financial returns will be much better and it can afford this kind of investment. Before it builds this line, KTZ must survey its customers with specific service and price proposals to better estimate the returns that should be expected from the investment. If the investment is to be worthwhile, the tariff for use of the line will have to be substantially higher than normal KTZ tariffs (on a cost per tonne-kilometer basis), but the overall price over the route will be lower than alternative routes.

KTZ should also survey customer who would benefit from this line to determine their interest in financing the line in return for substantial discounts on transport services. KTZ could also enter into a contract with customers willing to finance the line to pay them a fee for use of the line, basing tariffs on the cost of the fee. In this way, customers could chose to earn a return either from access fees or from reduced transport tariffs.

4.5.7 Signaling, Communications and Information Systems

Many elements of the proposed reform program depend upon improved communications, information systems investments and consolidation of dispatching centers. These three investments are closely linked with each other and with many elements of the reform process. The proposed investment plan is the same as that in the KTZ investment plan: about US$18 million for communications upgrades, including fiber-optic lines on key lines and improvement to internal digital phone network.

A US$ 12 billion investment is proposed in consolidating dispatching centers on lines with centralized signal control schemes. Control centers would be established at three centers, Astana, Almaty and Aktyubinsk. In addition to the consolidation, computer assisted dispatching systems would also be installed, extending the control of individual dispatchers and improving the coordination of operations across these regions.

The proposed investment plan includes US$ 25 million for improvements to KTZ's information systems. We believe the best use of these funds is for a new transportation information system, permitting control of transport operations, automation of way billing and order entry functions, wagon and locomotive management functions and wagon tracing activities. These systems will improve distribution and management of wagons and locomotives and reduce operating costs by

providing accurate train make-up information and shunting instructions. In addition, customer information systems can operate from the same basic data. This will permit centralizing all customer related station functions and automating the billing and customer service process. KTZ should develop a basic architecture for these systems before it purchases new computer hardware. We would encourage KTZ to look at North American information systems for large and regional railways. These systems have been developed over the past several decades and provide a reliable and relatively inexpensive means to modernize operating and back-office functions.

KTZ should also acquire cost accounting and general ledger packages designed for railway use. The it is critical for KTZ to develop cost data for each major customer move so that it can determine the level of profitability of major traffic flows. It should be able to use detailed cost information as a basis for the development of a more flexible tariff system. The same systems should be used to develop contract rates for major customers that offer volume discounts, service sensitive pricing, and encourage customer investment and operation of connecting lines, industrial spurs, equipment and other transport facilities.

Finally, KTZ has started a SAP system to manage purchasing systems. Information systems investments will permit the completion of the introduction of the SAP R/3 accounting and purchasing control systems. We encourage KTZ to consider its information systems investments for customer service and operations control centers before it determines the system architecture and hardware needed for its information system. We believe the operating, pricing and customer service uses will be a larger driver of systems requirements that the SAP R/3 accounting and purchasing system. We also believe that these systems are critical to the success of KTZ's reform and restructuring program.

4.5.8 Investment Plan Summary

The proposed five year investment program totals nearly US$ 1 billion over the five years between 1999 and 2003, an average of about US$ 185 million per year. This amount includes US$ 550 million in infrastructure renewal spending: US$ 300 million in track renewals, US$ 150 million for renewal of bridges and artificial structures and an additional US$ 100 million for all other infrastructure renewals. We have assumed that track renewal spending will be treated as an operating expense, rather than a capital investment and track renewals expenses are including in the operating cost portion of the financial statements shown in Appendix II.

Elements of the investment program are critical for the success of the restructuring and reform program. The most critical are for diesel locomotives, track maintenance machinery, and signal, communications and information systems. These permit the significant changes in the Reform Plan to take place.

V FINANCIAL ANALYSIS

The KTZ market forecast, restructuring plan, asset reduction plan, cost reduction plan and investment plan affect one another in complex and interactive ways. To structure the analysis of these issues in an integrated fashion, we have developed a financial model of KTZ operations. The model quantifies the financial impacts of alternative restructuring, investment, operations and marketing actions. It also provides a structure for analyzing the operation of the railway. The chapter that follows presents forecast financial results produced by the model for the reform program described in the previous chapters. Sensitivity analyses for likely deviations from the plan (such as lower traffic, lower tariff structures, and incomplete restructuring) are also described. The detailed financial projections produced by the model for the reform program described in this report are contained in Appendix II, a separate volume from this report.

5.1 Summary of Financial Performance

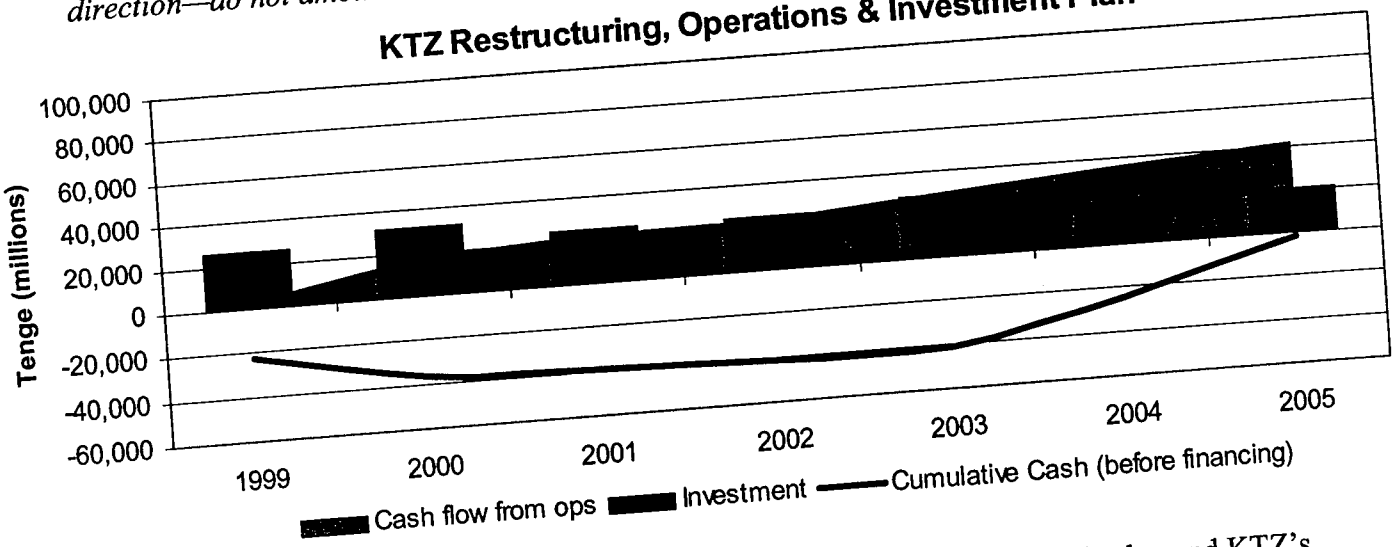
KTZ has developed three draft programs intended to improving the efficiency and financial performance of the railway. Those programs include:

- Restructuring Program, dealing with changes in the structure of KTZ itself and proposing some changes in the relationship between KTZ and the government.
- Operations Optimization Program, designed to reduce operating costs.
- Investment Program that implements the cost reduction program and provides for asset renewals.

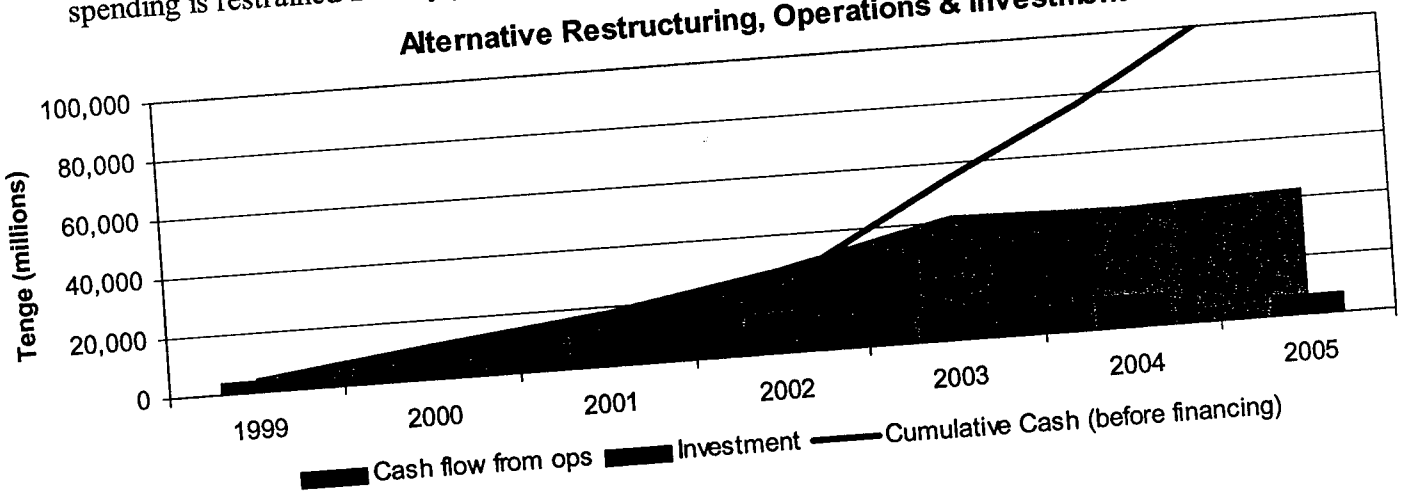
We forecast the effects KTZ's draft programs on KTZ financial results using the most likely traffic projection discussed in Chapter 3. This forecast assumes eight percent inflation and a 30 percent devaluation of the Tenge in 1999.

The graph below demonstrates the results. KTZ's ability to fund investment internally is represented by its cash flow from operations. The investment program outlined by KTZ amounts to US$ 330 million per year for 1999-2003. Of this, some US$ 60 million appears to be expenditures already captured in the financial model as track operating expenses. The remaining capital investment (about US$ 270 million per year) is significantly greater than the funds KTZ can generate internally to finance it. If KTZ nonetheless pursued such an investment program, it would amass a deficit of nearly 42 billion Tenge by 2002. Obtaining financing for such a deficit

from either governmental or commercial sources is quite unlikely. *Thus, the financial analysis indicates that the actions defined in the three KTZ plans—while moving the railway in the right direction—do not amount to a financially viable plan.*



The consulting team's review of KTZ indicates that considerable scope remains beyond KTZ's current plans for reducing costs and prioritizing and reducing investments. The more aggressive cost reduction programs and leaner investment plan discussed in Chapter 4 are designed to transform the KTZ plan into a financially viable strategy for the reform of the railway. This plan produces a much sounder financial picture than the KTZ draft plan. As show in the graph below, the cost cutting measures result in substantially greater net income in 2003-2005, and capital spending is restrained in early years when KTZ cannot support a large investment program.



The alternative plan differs from the KTZ plan in several key areas:

- Cost cutting is more comprehensive and sustained, substantially reducing KTZ's cost structure over time. KTZ reduces assets, employment, and other resources to only those required to serve its projected volume of business. Changes in operational and business practice are instituted to increase productivity of assets and labor. Investments increase labor productivity, fuel efficiency, track material life and productivity of other inputs.

- The investment program is leaner, and many investments are delayed until later years. Until the cost saving measures take effect, KTZ cannot afford a high level of investment. Consequently, the investment program focuses on cost saving investments in the early years and defers many other investments to later years.

The cost reduction efforts, together with lower capital expenditure, helps KTZ's funds stay in much better balance. The cumulative cash balance stays positive throughout the period and and rises to a surplus of 120 billion by 2005. KTZ does not build a significant debt position and the enterprise is financially viable.

5.2 Revenue and other sources of income

KTZ markets, traffic and revenue projections are discussed in detail in Chapter III. Under assumptions about traffic levels and rates considered the most likely to occur, KTZ real revenue is expected to grow from 81.5 billion tenge in 1998 to 96.7 billion tenge in 2015. (To permit easy year-to-year comparisons, all figures in section 5.2 are presented in real—uninflated—Tenge.) The main components of the revenue forecast are shown in the table below.

KTZ Revenue Forecast (tenge 000,000)

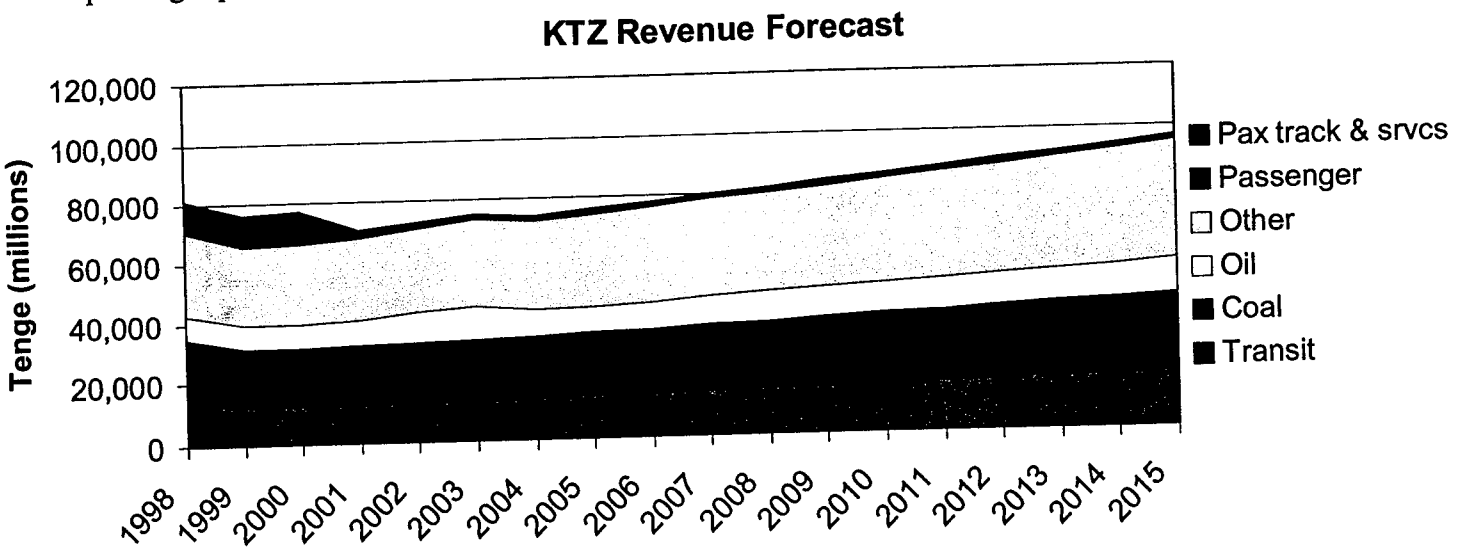
	1998	1999	2000	2001	2002	2005	2015
Freight tkm (000,000)	122,604	116,247	120,287	125,188	131,282	139,027	179,376
Passenger km (000,000)*	10,657	10,480	10,551	7,023	7,133	7,276	6,555
Freight revenue	70,763	65,531	66,049	68,028	70,703	74,017	94,761
Passenger revenue*	10,760	10,678	11,210	0	0	0	0
Passenger track & services*	0	0	0	2,499	2,332	2,037	1,926
Total	81,523	76,209	77,259	70,527	73,035	76,054	96,688
Bad debt		1,917	1,946	1,973	2,031	1,360	1,406
Barter conversion cost		190	173	151	127	87	90

Source: Appendix II: KTZ Pro Forma Financial Statements.
* After 2001, KTZ does not provide passenger service, but does provide infrastructure for passenger service operators.

The largest element of KTZ revenue is derived from freight operations. These revenues are expected to decline in 1999 because of price reductions taken in the last half of 1998 and because the Russian economic crisis is expected to reduce traffic volumes of major commodities such as coal and ores. Traffic recovery is expected to begin in 2000 for all commodities except grain, which continues to decline until 2001. Oil volumes grow particularly rapidly until 2004, when the completion of an export pipeline is expected to divert KTZ traffic. Given the downward pressure on prices that occurred in 1998, no real price increases are forecast. Some real price declines are assumes as customers take advantage of discounts for cash payment.

Passenger revenue is expected dip in 1999 and recover partly in 2000. In 2001, KTZ is assumed to privatize the Passenger SSE. Following this privatization, KTZ only sells infrastructure access to the private passenger service provider(s). The access rates assumed are based on the cost to KTZ of providing infrastructure. Some risk exists that KTZ will be required to continue to cross subsidize the passenger service from freight service. This could occur (1) if privatization of the

Passenger SSE is delayed or blocked, or (2) if KTZ is required to provide access to the private passenger provider(s) at rates less than cost.



KTZ has experienced major problems collecting freight revenue. Stepped up efforts to collect past due accounts and withhold services from clients who fail to pay have reduced the magnitude of this problem, but it remains a serious concern. Bad debt (accounts past due over 12 months) is estimated to be 3 percent of revenue in 1997, a significant drop from prior years. KTZ and other enterprises in Kazakhstan have developed creative barter and account receivable swapping (offset) arrangements, which have helped reduce bad debt. As KTZ steps-up collections and customer credit management efforts become more effective, the bad debt percentage is expected to decline, shrinking to 1.5 percent by 2007.

In addition to bad debt problems, KTZ revenue collections have been complicated by payment in goods rather than in cash. To realize the value of these goods KTZ must itself (1) use the goods, (2) sell the goods, (3) trade the goods for materials the railway needs, or (4) trade the accounts receivables from customers for KTZ accounts payable (offsets). This results in transaction costs, which are shown in the financial forecast as "Barter Conversion" costs. In 1997, these costs were estimated to be 7 percent of the value of goods bartered and 4 percent of freight revenue. By 1998, most non-cash transactions occurred in the form of offsets, which have much lower transaction costs than the physical transfers of goods. Thus barter conversion costs are now estimated at 0.3 percent of revenue and are expected to decrease to 0.1 percent of revenue by 2003.

5.3 Operating Costs and Cost Reductions

Under the most-likely traffic forecast, and cost and asset reduction and investment plans discussed in Chapter IV, KTZ operating expenses are expected to decline by some 64 percent in real (1998) tenge from a high of 91 million tenge in 1999 to 59 million tenge in 2015. (To permit easy year-to-year comparisons, all figures in section 5.3 are presented in real—uninflated—Tenge.) During this period, freight tkm increase more than 50 percent from 116 billion in 1999 to 179 billion in 2015. We have assumed that the passenger business is privatized so that KTZ incurs only the infrastructure-related costs of providing passenger service (for which it is receives payment from passenger service operators).

Numerous railway supply industry activities (track work, locomotive workshops, rail welding and sleeper production) are to be privatized during the period. Consequently, direct KTZ inputs (labor material) decline, but some are purchased back in the form of 3rd party services, which increases significantly. Highlights of the work performed, the resources used and the resulting operating expenses are shown in the table.

KTZ Operating Expense Forecast (tenge 000,000)

	1998	1999	2000	2001*	2002	2005	2015
Transport Task							
Freight tkm (000,000)	122,604	116,247	120,287	125,188	131,282	139,027	179,376
Passenger km (000,000)*	10,657	10,480	10,551	7,023	7,133	7,276	6,555
Required Locomotives							
Electric	644	631	442	305	231	173	183
Diesel	1,647	1,569	999	689	424	297	275
Employees	137,160	129,148	117,124	81,917	66,540	46,624	41,719
Operating Expenses							
Salary & Benefits	21,649	20,399	18,638	13,553	11,472	8,579	11,637
Materials	18,718	18,097	16,874	14,208	13,128	6,628	6,730
Fuel	7,147	6,872	7,009	5,173	5,004	4,086	4,696
Electrical Power	5,542	5,266	5,249	4,195	4,138	3,947	4,811
3rd Party Services	5,019	4,776	4,428	3,222	2,848	9,857	9,600
Internal Services	4,675	4,465	4,149	2,769	2,494	1,024	1,146
Depreciation	17,030	17,637	16,548	13,416	13,082	11,792	11,739
Other	6,658	7,727	7,330	6,244	5,958	4,042	4,099
Administrative	5,433	5,323	5,274	4,597	4,503	4,120	4,361
Total	91,873	90,562	85,498	67,376	62,629	54,076	58,818

Source: Appendix II: KTZ Pro Forma Financial Statements.
* After 2001, KTZ does not provide passenger service, but does provide infrastructure for passenger service operators.

As the table demonstrates, the business plan anticipates significant productivity gains in many areas of operations. While some of these gains are quite significant, the productivity levels anticipated are well within levels achieved by comparable railways in other parts of the world.

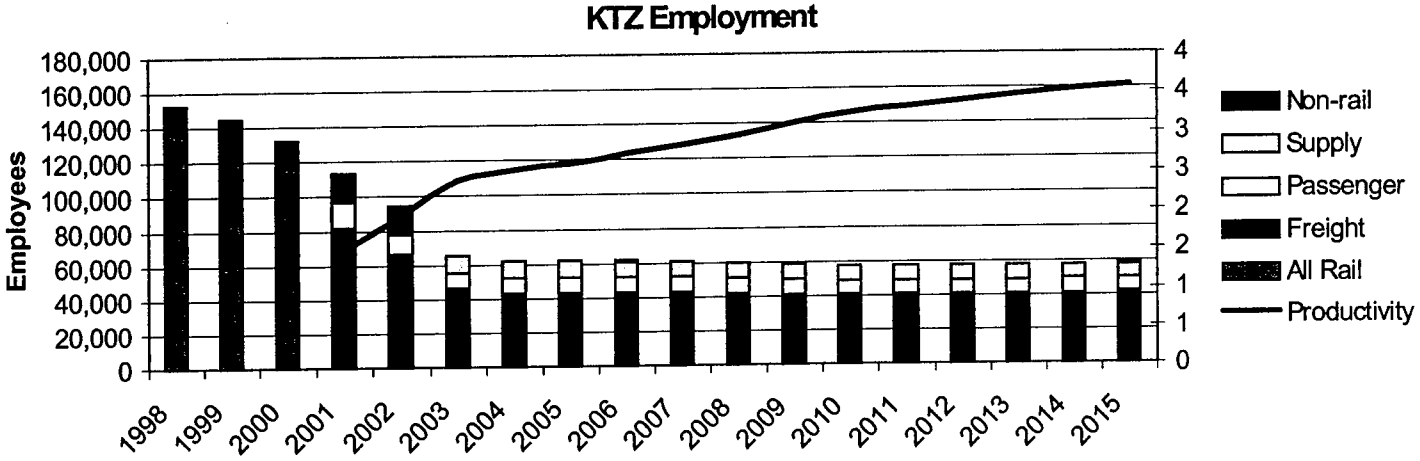
5.3.1 Salary and Benefits

KTZ salaries are projected based on the compensation levels currently provided by KTZ to various groups of employees and the expected number of employees in each group. This figure includes base compensation, social insurance, profit sharing, and some living allowances and other benefits. Real wages are expected to decline in 1999 and increase starting in 2001, with 4 percent annual growth after 2004.

During the projection period, KTZ's labor force is projected to decrease from 152,000 to 42,000. In part, this is accomplished by divesting activities. Of KTZ's 152,000 employees in 1998, 15,000 are engaged in passenger transport activities and are shifted from KTZ when the Passenger SSE is privatized in 2001. Another nearly 16,000 are engaged in non-transport activities, which are

privatized in 2003. A further 15,000 are engaged in rail supply industry activities, which are privatized in 2003. Of these employees, KTZ buys back the services of about two-thirds.

Beyond the restructuring measures, the cost reduction program outlined in Chapter IV reduces the number of employees in KTZ required to produce railroad services by more than 60,000 people. As shown in the graph, the productivity of the employees in KTZ and in the rail supply industry serving KTZ increases from 1.5 million tkm per employee in 2001 to 2.5 million in 2004 and ultimately to 3.6 million in 2015. This productivity level is comparable to the productivity achieved by the Kazakhstan railways in the early 1990s.



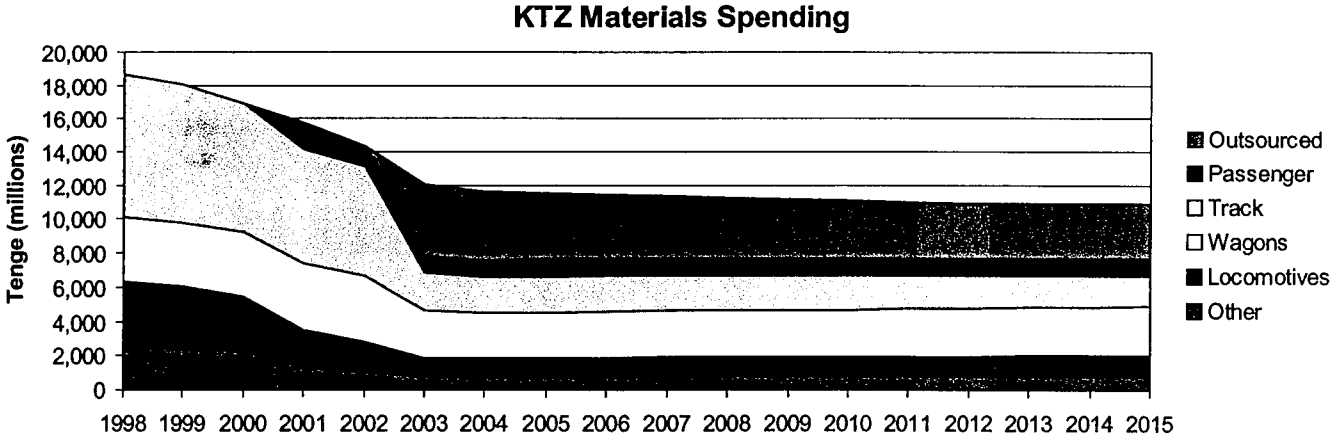
The cost reduction program outline in Chapter IV calls for significant numbers of employees to be released from the rail industry to more productive uses in the Kazakhstan economy. This rapid shift appears to have the approval of government, which has instructed KTZ to eliminate 40,000 employees.

KTZ may well be able to accomplish this change without incurring severance payments or retraining expense. If such expenses are necessary to reduce employment, KTZ would nonetheless benefit financially from undertaking them. For example, if KTZ paid one year's salary as severance to all departing employees over a 5 percent attrition rate, the total cost would amount to 5.3 billion tenge. The investment in severance payments would have a payback period of one year and internal rate of return after five years of 46 percent (100 percent through the end of the projection period).

The World Bank is experience at helping railways design employee reduction and retraining programs and frequently finances them. Typically, a World Bank sponsored program would include financing for an employee redundancy program, retraining, and retirement top-ups and would be secured by some real property or future secured stream of income. In this case, such a loan could be secured by the proceeds from the privatization of railway enterprises. Details of the program must be negotiated with the World Bank. Such programs have been very successful in a number of cases, including the restructuring and privatization of Argentina's railways.

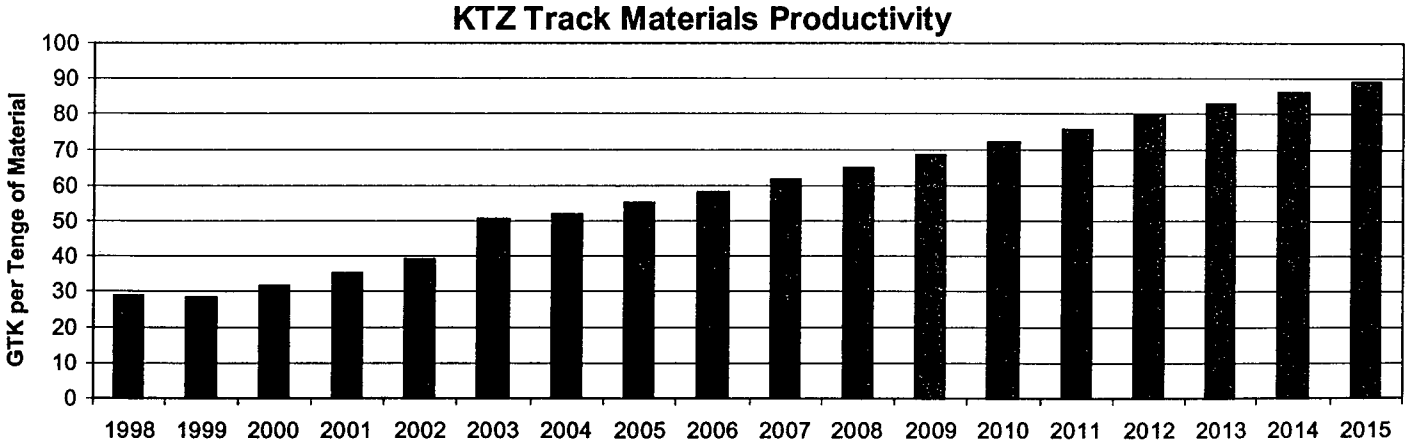
5.3.2 Materials

KTZ materials costs are projected based on the activity levels in tasks such as track, wagon, coach and locomotive maintenance. As shown in the graph below, KTZ materials spending is expected to significantly decrease, especially in the next five years.



This has several causes. First, restructuring moves over 40 percent of materials spending out of KTZ and into other businesses. In 2001, over 1 billion Tenge in materials expenditures (mostly for coach and locomotive repairs) are privatized with the passenger unit. In 2003, excess locomotive workshops, wagon workshops, and mechanized track units are privatized. KTZ buys back about three-fourths of the materials spending outsourced in 2003 (shown in the chart above).

A second reason KTZ materials expenditure shrinks is that the asset base to be maintained—particularly track and rolling stock—shrinks. Track-km are reduced from 27,000 in 1998 to 20,000 in 2004. The diesel locomotive fleet is also renewed and reduced in size from 600 to just over 150 during the same time-period. Stations are reduced from 800 in 1998 to just over 400. The wagon fleet is also reduced.



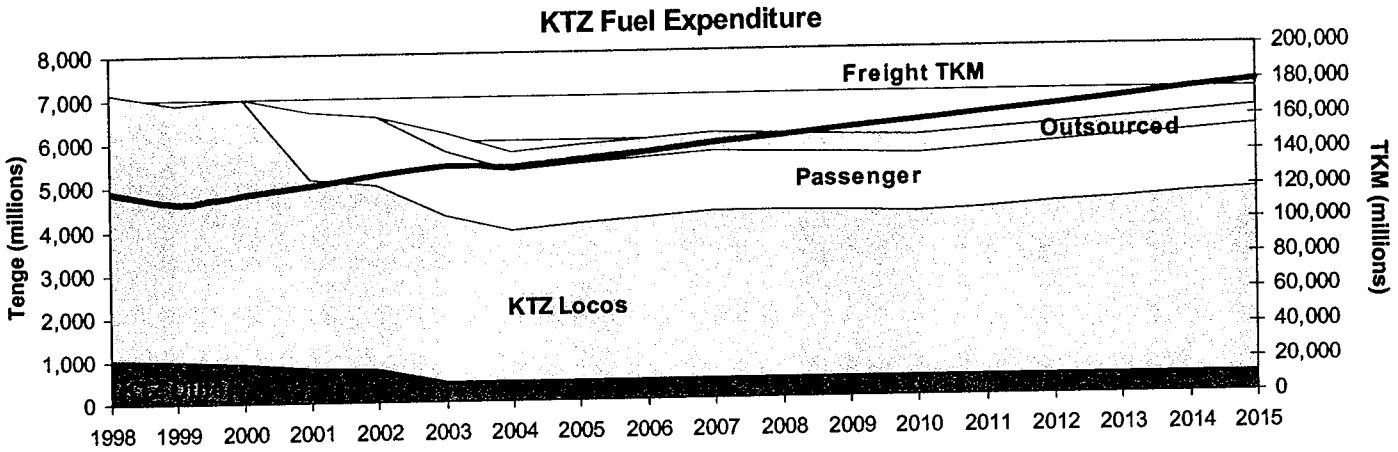
Third, materials productivity in rolling stock and track are also increased. Investment in new/re-engined diesel locomotives reduces the materials expenditure per locomotive-km by more than 40 percent. Investment in new track maintenance machinery, coupled with new track maintenance methods dramatically extends the life of track materials. As shown in the graph above, the GTK

produced for each Tenge of track materials expenditure (including outsourced activities) increases threefold over the projection period.

Overall, This brings KTZ's materials spending from over 18 billion Tenge in 1998 to 7 billion Tenge by the end of the projection period (10 billion, if outsourced materials spending is included).

5.3.3 Fuel

Fuel costs are based on the consumption of fuel (and lubricants) in all areas of KTZ activity, but primarily on the operation of diesel locomotives. KTZ fuel costs are projected to fall (on a real basis) from 7.1 billion tenge in 1998 to 4.7 billion tenge by the end of the projection period. As with materials, this decline results partly from restructuring and partly from productivity improvements.



As the graph shows, about 1.5 billion tenge of fuel expense is for the passenger unit and will be spun out of KTZ in 2001. The significant decline in fuel expense after 2001 is caused by three main factors:

- By replacing/reengining the diesel locomotive fleet, KTZ is likely to see a 15 to 25 percent improvement in fuel efficiency. As discussed in Chapter IV, this investment should be made earlier than many under KTZ consideration, because it will yield immediate and substantial costs savings.

- Management of locomotives on a system-wide basis separate from management of crews. This changes requires no investment and accounts for about a quarter of the fuel efficiency improvement shown in the graph.

- Development of a new operating plan, with a more efficient train plan and blocking plan provides the remaining quarter of the fuel efficiency improvement shown.

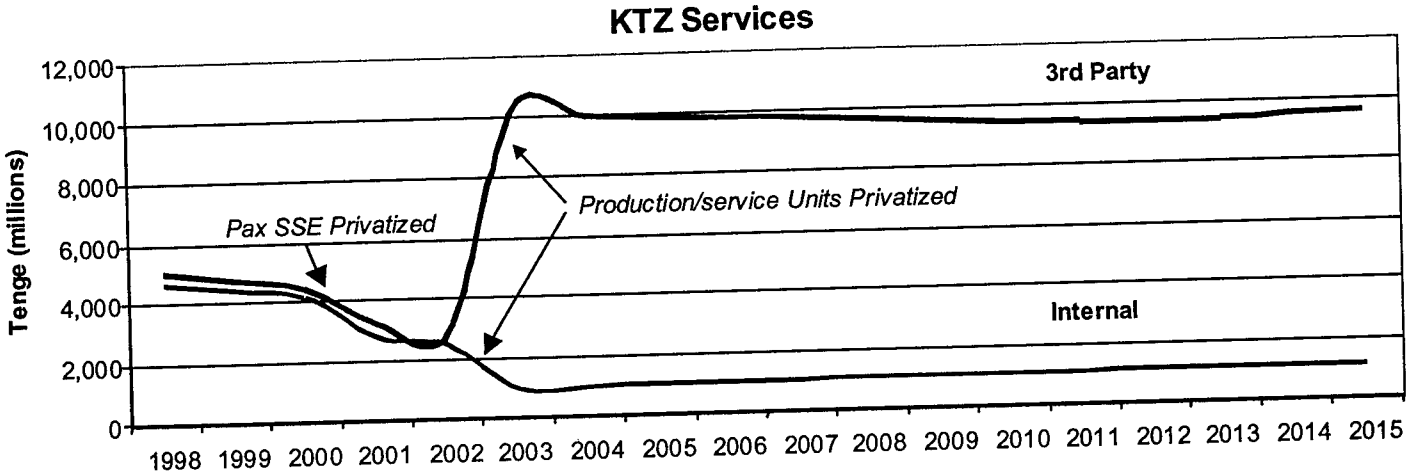
Once these productivity improvements are realized, KTZ fuel expenditures are expected to increase because of traffic growth.

5.3.4 Electric Power

Electrical power expenses are based on the consumption of electricity in all areas of KTZ activity, but primarily on the operation of electric locomotives. KTZ electric power costs are expected to decline by about 1 billion Tenge in 2001 when the Passenger SSE is spun out of KTZ. In subsequent years, the productivity improvements deriving from the management of locomotives on a system-wide basis and the development of a new operating plan will apply to electric as well as diesel locomotives. Traffic growth will offset this per unit savings, causing KTZ total electric power expenditure to gradually increase to 4.8 billion Tenge by the end of the projection period.

5.3.5 Services

KTZ purchases services from KTZ-controlled production/service units and from third party vendors. KTZ expenditure on services from each source is expected to decline by over a billion Tenge in 2001, when the Passenger SSE is privatized.



In 2003, many of the KTZ non-transport activities are to be privatized, so the services and materials (e.g., track materials) they sold to KTZ shift from being internal services to third party services. Also in 2003, locomotive workshops, wagon workshops, mechanized track work, civil construction units and security activities of KTZ are privatized. KTZ buys back some of the services produced by these units, causing KTZ expenditures on third party services to increase.

5.3.6 Depreciation

Depreciation expenses are based on the replacement value of the rolling stock needed for KTZ operations and on estimates of written-up historical depreciation for other assets. The advantage of using this depreciation method for the financial projection is that depreciation then represents the capital expenditures the railway would need to make to sustain its asset base. Depreciation declines significantly over the projection period, in 2001 when the Passenger SSE is privatized and in 2003-2004 as asset reductions in track, stations, wagons and locomotives take place. After 2004, depreciation remains fairly steady at approximately 11.8 billion Tenge per year.

5.3.7 Other

Other operating expenses contain a variety of elements including taxes (other than income and value added tax), transport service penalties, bad debt and barter conversion costs. These cost are projected, based on railway activity levels.

5.4 Other Income and Expense, Taxes, and Debt

KTZ has historically realized income from industrial production, construction and other activities that are not core railway activities (about 4.4 billion tenge in 1998). The business plan assumes that KTZ sheds these non-railway activities in 2003, and has no revenue or expense relate to them after that time.

The Kazakstan railways historically shouldered a significant social burden, which included expenditures for community housing and services, medical facilities, educational facilities and farms. This social expenditure amounted to about 5 billion Tenge in 1996. KTZ has transferred medical and educational facilities—along with their social subsidy requirements—to government. By 1998, social service expenditures were under 2 billion Tenge. Social obligations are expected to remain for community housing and services, but at a reduced level commensurate with KTZ's smaller workforce and reduced presence in many communities.

Income tax is estimated from KTZ revenue and operating expenses, gains and losses on non-core activities, and other allowable deductions such as social payments. These tax computations are necessarily simplistic, and actual VAT and income tax payments during the next few years may be significantly affected by negotiations with the Kazakstan government over issues such as recognition of bad debt and reimbursement of taxes paid on accounts subsequently rendered valueless by government action.

Interest expense and loan principal payments are projected, based on (1) KTZ's existing medium and long term loan obligations and (2) estimated payments under EBRD/OECF loan program. These loans are denominated in yen, marks and dollars. Conversion of interest and principal payments into tenge is based on current exchange rates and projected inflation rates for the yen, mark and dollar relative to the tenge.

5.5 Sensitivities and Risk

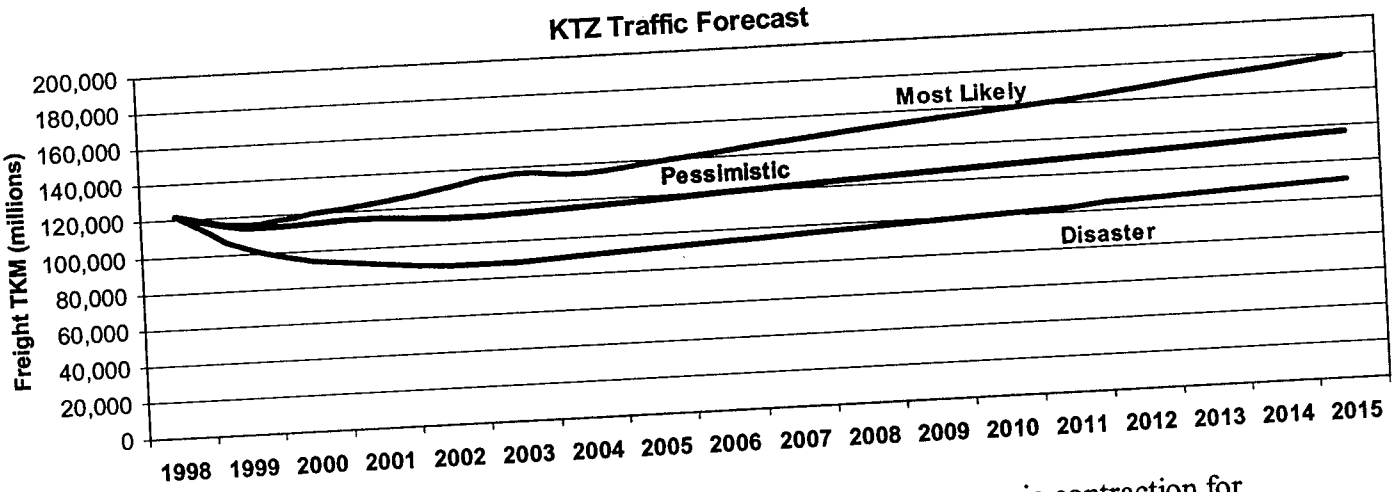
The financial forecast presented as part of this business plan represents the best professional judgment of the consulting team about the economic circumstances in which KTZ operates and the most effective investment and restructuring steps for KTZ to take. As discussed above, however, the forecast is dependent on many assumptions about markets, restructuring and changes in KTZ operations. The changes in KTZ operating practices that will reduce KTZ's cost structure are largely within KTZ's control. Some of the other important circumstances and changes assumed are less within KTZ's control. These include changes in transport markets, traffic and rates, and restructuring of passenger services.

5.5.1 Low Traffic

The financial forecast is based on the markets and traffic volumes discussed in Chapter III. These are the traffic volumes that we believe KTZ is most likely to experience. They are sensitive to the economic conditions of Kazakhstan and neighboring countries, particularly Russia. The most likely traffic forecast is based on:

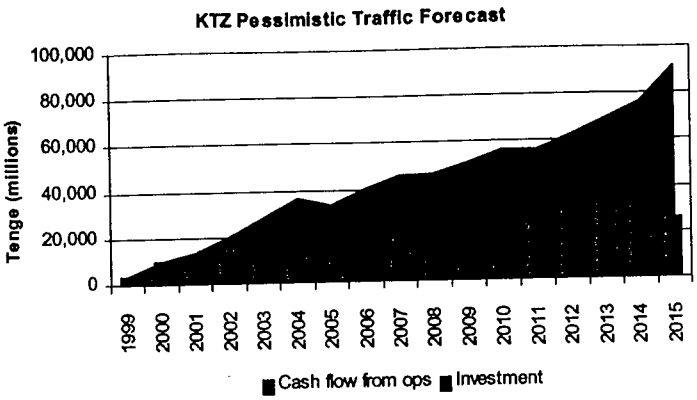
- The economy of Kazakstan shrinking slightly in 1999, growing strongly (~5 percent) between 2001 and 2007 and moderately (~ 3 percent) for the rest of the forecast period.
- The economy of Russia contracting 7 percent in 1999 and growing at 5 percent per year from 2001 to 2015.
- The economy of Uzbekistan growing moderately throughout the forecast period, and
- The economy of China growing strongly (5 to 8 percent) throughout the period.

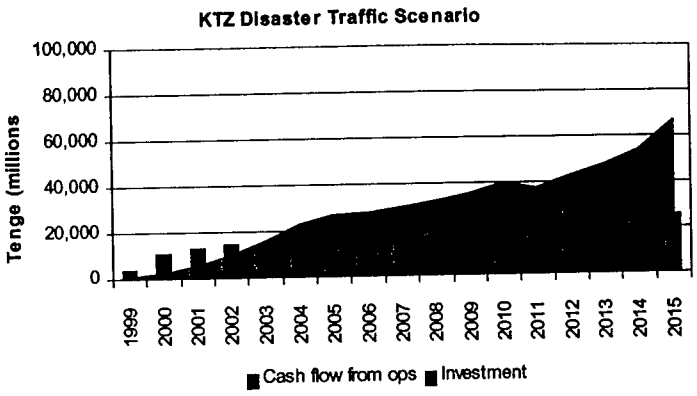
In the most likely traffic scenario, KTZ freight traffic dips in 1999, but grows to nearly 180 billion tonne-km by 2015.



A more pessimistic traffic forecast was developed based deeper economic contraction for Kazakhstan and Russia, and slower growth (2 percent) over time. This results in much slower traffic grow, reaching freight traffic of 136 million tonne-km in 2015. An even more pessimistic traffic scenario, the "disaster scenario" is based on economic contraction twice as severe as the pessimistic scenario, with slow recovery starting in 2002 for Kazakhstan and 2003 for Russia. In this case, freight tonne-km do not regain their 1998 level during the forecast period.

As shown in the graph below, under the "pessimistic" traffic scenario, KTZ's forecasted cash flow from operations is nearly equal its capital investment requirements in 1999 and 2000, and starts to exceed its capital investment requirements in 2002. By the end of the forecast period, cash flow from operations significantly exceeds investment requirements.

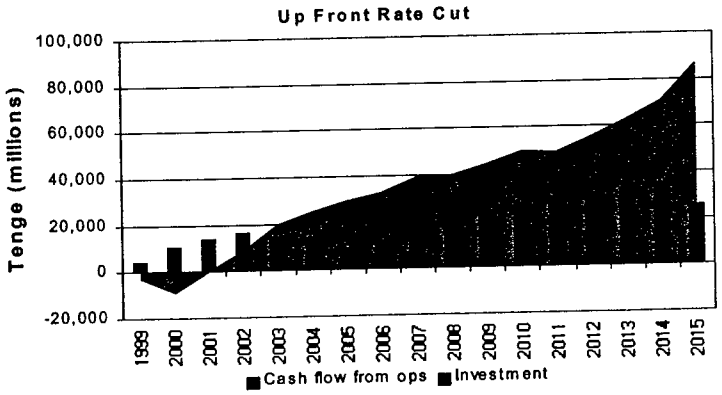


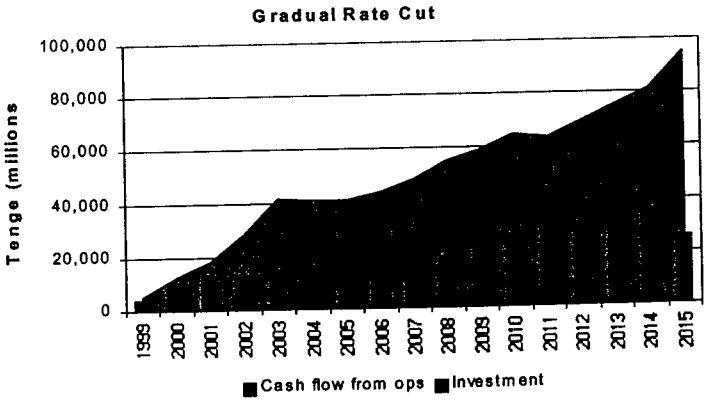


In the "disaster" traffic scenario, KTZ's forecast cash flow from operations is positive, but less than its capital investment requirements until 2003. After that point, cash flow exceeds investment and financing requirements. Cumulative cash flow becomes positive in 2005 and increases gradually through the end of the forecast period.

5.5.2 Rate Reductions

The financial forecast assumes that KTZ's real rate levels change little from current levels (some decreases occur as customers take advantage of discounts for cash payment). Given the largely political and arbitrary process for establishing KTZ's rates, however, a significant risk exists that KTZ's rates could again be cut. This would have an extremely negative effect on KTZ's financial health. The graph below entitled "Up Front Rate Cut" shows the impact of a 30 percent rate reduction on domestic and export/import traffic, if imposed in 1999. Because of the price inelastic nature of much of KTZ's traffic, a 30 percent rate decrease would produce an estimated 11 percent increase in tonne-kilometers. Cash flow from operations would be significantly negative until 2001, and would not exceed cash required for investment and financing until 2003. Cumulative cash flow would not turn positive until 2006.





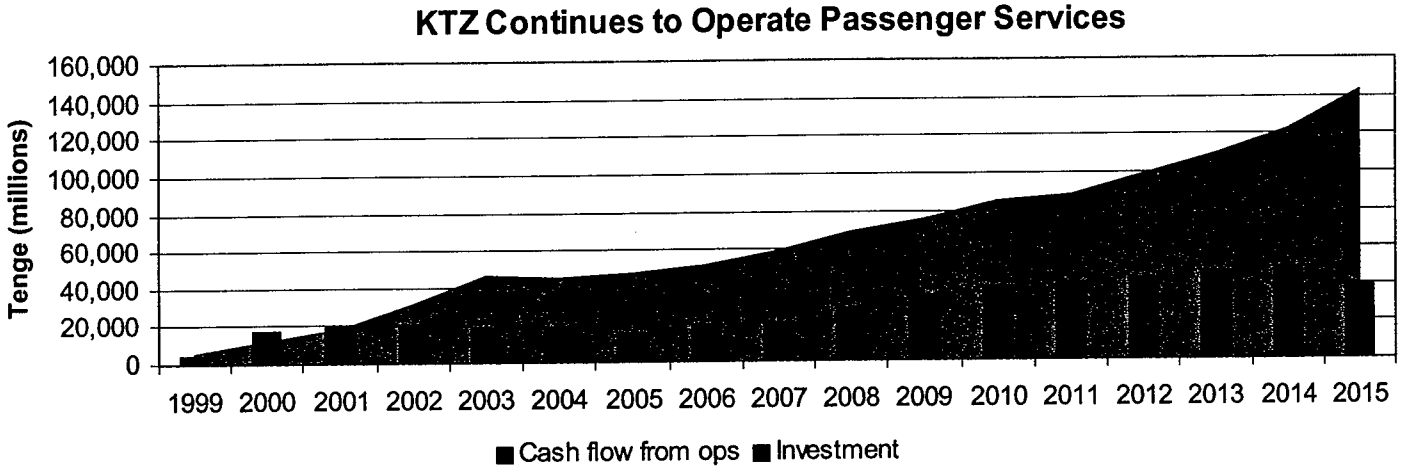
By contrast, once KTZ has undertaken the first few years of restructuring, it would be able to reduce rates as it reduced costs, without jeopardizing its financial situation. The graph above entitled "Gradual Rate Cut" shows the impact of a 3 percent rate reduction on domestic and export/import traffic, if implemented each year 2005 – 2015. By the end of the forecast period, KTZ would be carrying 15 percent more traffic than if it had not decreased rates and four percent more than if rates had been decreased 30 percent in 1999. Cash flow from operations would positive throughout the forecast period, and would exceed cash required for investment in every year.

This illustrates that KTZ could strengthen the Kazakhstan economy through lower transport cost and remain financially viable, if:

- Significant rate decreases follow, rather than precede KTZ's first phase of restructuring.
- Rate decreases are implemented over time as KTZ continues to cut costs.

5.5.3 Passenger Services Restructuring

The financial forecast assumes that the proposed restructuring of passenger services into a private entity or entities will occur in 2001. A risk exists that this restructuring will occur more slowly or not at all. A risk also exists that even it passenger services are privatized, KTZ will be required to cross-subsidize passenger services through providing infrastructure access at below cost.



The graph above illustrates the effect on KTZ's finances of continuing to operate passenger services. KTZ's cash flow from operations increases, because passenger service revenues are all collected in cash. Its investment requirements also increase for passenger coaches, station improvements, and computer systems. Overall, however, assuming the burden of the passenger services reduces KTZ's net cash flow in every year. If KTZ does not experience any of the other serious downside risks (disaster traffic scenario or a large up-front rate reduction), it could remain financially viable while cross-subsidizing the passenger service. Continuing to subsidize the passenger business, however, would impair KTZ's ability to reduce freight rates over time. Reducing freight rates is likely to have much greater long-term benefit to the economy of Kazakhstan than providing loss-making passenger service. Given the other compelling reasons to privatize the passenger business—improving its business and marketing focus and ending economically distorting cross subsidies—KTZ's potential ability to subsidize passenger services does not justify requiring it to do so.

Losses from passenger operations should be subsidized by the governments involved (local authorities in the case of commuter traffic, the national government in the case of long distance and international trains), not by other freight shippers. Freight-to-passenger cross-subsidies distort both the freight and transport marketplace and unnecessarily tax freight shippers and the economy rather than provide for the general welfare.

VI PRIORITIES, IMPLEMENTATION, AND COMPETITION

In countries where railways are important means of transport, railway performance has a significant impact on the economy performance. In an increasingly competitive world, it is important to get railway transport right, especially railway freight transport. The major components of most developing economies are natural resource extraction and agriculture sectors. Each is dependent on high transport service levels and low transport prices for competitive access to world markets. In such economies, economic growth is critically dependent on railway sector performance.

In developing countries, where government spending is limited by tax revenue but the need for government spending programs is not, ineffective railway transport can cost much more than it seems. When governments don't have enough money to support health care, education, and basic social safety net programs, an inefficient railway can cost far too much—high operating subsidies, excess investment requirements, and expensive transport prices. Governments that have restructured and reformed their railways, introduced competition in transport environments, and reduced transport regulation have seen real changes in the financial impact of transport. Railway costs drop dramatically, investment requirements decline substantially and most investments are financed in the private sector, transport prices fall dramatically—usually about 20 percent or more. Countries as diverse as New Zealand, Argentina, Mexico, Brazil, and Australia have seen economic growth spurred by transport deregulation and railway reform.

Railways are complex organizations. Vertically integrated[75] state-owned railways are even more complex. Most state-owned railways have been manipulated over many years to achieve goals other than transport efficiency. In fact, transport efficiency was often not a major consideration. Other policy objectives were more important—high employment, low transport prices for other state enterprises, high passenger transport availability, low passenger transport prices, high national defense capabilities. In such environments, some shippers paid high prices to subsidize other shippers and passenger operations. Managers had little incentive to achieve efficiency but every incentive to ensure that railway services met the objectives their governments set for them. In doing so, railways acquired assets, organization structures, practices, and personnel that were

[75] Vertically integrated refers to an enterprise or organization which includes most functions associated with producing the desired output. For example, vertically integrated railway would have capabilities in diverse support functions that might include manufacturing (ballast, sleepers, rail cars, sometimes locomotives), construction, design, agriculture, warehousing, as well as downstream responsibilities such as employee education, health care, resort facilities, or housing.

suited for these purposes but not necessarily suited for economically efficient transport. Because railways are complex network businesses, it is difficult to determine the costs associated with such choices. The evidence of railway reform and restructuring is that these costs are very high. In countries of the former Soviet Union and Eastern Europe, rapid structural reforms of the economy have resulted in significant changes in the demand for freight and passenger transport. Economic changes make railway reform and restructuring significantly more important. In Kazakhstan, the dependence of the economy on rail transport makes reform both more urgent and more rewarding. It also increases the requirement that reform is done carefully.

Many steps in a reform process have been described in the preceding chapters of this report. Which are most important? How should KTZ proceed in implementation? In this Chapter we describe priorities and implementation strategies. The last section of the report discusses some different approaches to railway reform that the Government of Kazakhstan may wish to consider as it restructures the railway transport industry in Kazakhstan.

6.1 Priorities

If KTZ is to become a successful enterprise, it must develop better marketing capabilities. In Chapter 3 we described KTZ's markets and described some actions KTZ should take to enhance revenue. In Chapter 4, we described how KTZ's proposed first Reform Plan could be modified and enhanced to improve the financial viability of KTZ. The most important elements of the reform process are summarized below.

6.1.1 Revenue Enhancement

One of the most important ways to improve financial performance in a market economy is to manage and enhance revenue. For KTZ, revenue enhancement should involve managing declining and increasingly differentiated tariffs, a shift to negotiated transport pricing, government pressures on pricing, and competition for its most valuable traffic. Price sensitive customers can be deterred from shipping if prices are too high. Transport pricing should involve more than a quoted rate or tariff. Payment terms, extension of credit, volume discounts, pricing to encourage investment in the business (as in purchasing rail cars) all should be a part of the revenue management process. Marketing, pricing and revenue management are new tasks for KTZ. The environment for setting rail prices in Kazakhstan is changing rapidly. KTZ must develop the tools, capability, information, and organization structure to address this increasingly important element of the railway environment.

While KTZ has implemented a new accounting system, it does not have a good costing system. Consequently, KTZ cannot easily identify its most profitable and unprofitable traffic. In the evolving tariff regulatory environment, KTZ cannot defend its tariff structures from shipper protests or arbitrary actions by the government to aid specific industries. KTZ needs this information.

KTZ must develop commercial pricing processes so that it can use this new information to improve profitability, direct marketing efforts, and negotiate price and service agreements with its customers. KTZ should move to implement contract pricing and develop incentives for customers to use more rail transport while also enhancing the profitability of this traffic. To do this, pricing strategies will have to move from tariff based to contract and commercial negotiated prices.

Tariffs should begin to represent the maximum prices charged to companies who don't have a shipping relationship with KTZ. Others should have pricing determined by the value of the transport, their ability to pay, KTZ's costs and investment requirements to support the traffic, credit and payment conditions, volumes shipped and similar conditions. Finally, KTZ's knowledge of and ability to respond to its customers is limited by its lack of a customer oriented marketing department.

Priorities for KTZ for Revenue Enhancement are described below.

Acquire a traffic cost accounting system: We believe KTZ now has most of the accounting systems necessary to develop traffic-specific cost data. It should acquire a cost accounting system and develop the cost basis for its major freight movements. The World Bank has available a number of traffic costing systems that should be applicable to KTZ traffic. Some of these systems can be distributed free of cost. All of them will require some modification to adapt them to KTZ data and conditions. KTZ personnel will need to be trained in their use. As a first step, KTZ should contact the World Bank's country and railway representatives to determine how it can acquire these tools.[76] These systems could be acquired and in use within 6 months. This is the highest priority action in Revenue Enhancement.

Develop Commercial Pricing Processes: KTZ should develop negotiated pricing structures with its major customers. Such structures should include the many considerations that determine financial performance, costs, and service. The process should start with the definition of customer requirements and include KTZ cost elements, payment structures, volume of shipments, and credit terms. KTZ should also construct the basis to develop a pricing structure for other services that KTZ provides from providing and maintaining equipment, to advice on loading methods. Some changes in internal practices, such as negotiated rates, pricing differentiation policies, and service/cost tradeoff evaluations, will be required. If customers or other entities are to provide equipment, these arrangements must be reflected in the pricing structure KTZ proposes. How they are reflected must be based upon KTZ's reform strategy, financial condition and the assets required to provide the services agreed.

Implementation of new commercial pricing processes is most likely to manifest itself as the development of a pricing group within the existing CFTS organization. KTZ employees should receive some training in cost and market analysis. The pricing group should study transport contracts, marketing and pricing strategies used in market economies. During this study, a collection of agreements, contracts and standard practices should be collected. The group should include a lawyer, contracts specialist, financial analyst, and operations expert, as well as staff trained in marketing.

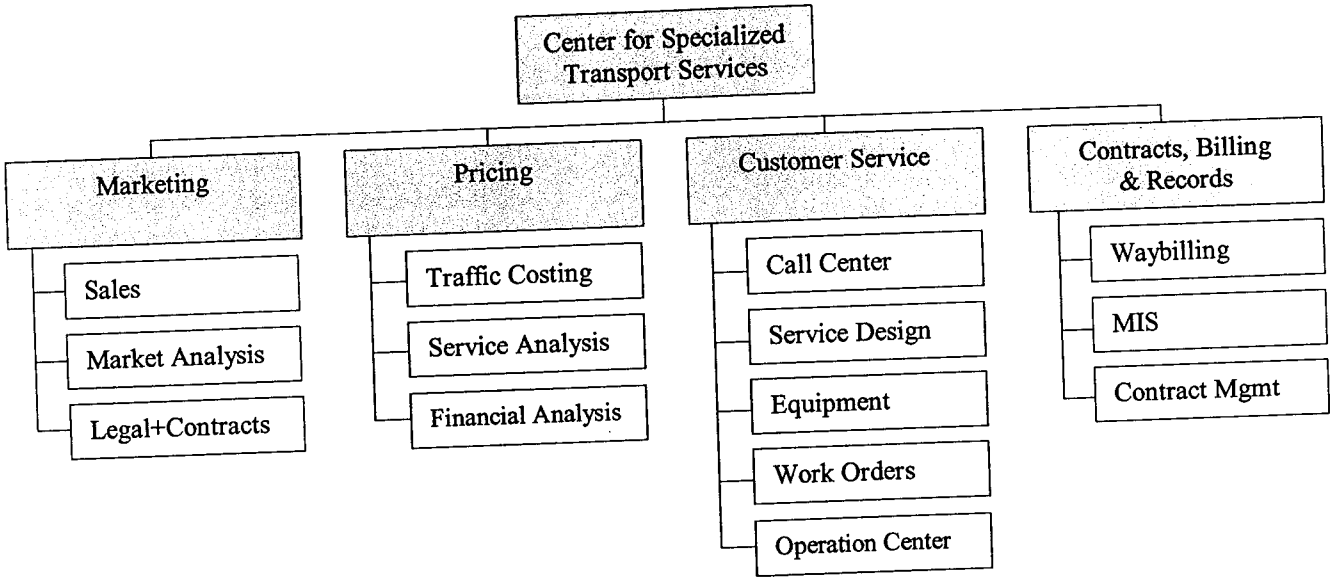
It may be necessary to change tariff structures, change transport law or make other modifications in procedures to permit direct negotiation of price and service arrangements with major customers. The development of commercial pricing practices can occur at the same time as the

[76] World Bank contacts for KTZ are: Country Officer: Jean Charles Crochet, Senior Financial Analyst, The World Bank, 600 19th Street, Washington, DC 20433, Phone Number (202) 473-1159. Railway Adviser: Louis Thompson, Senior Railway Advisor, The World Bank, S6-055, 1818 H Street, NW, Washington, DC 20433, Phone number (202) 473-3785.

acquisition of the traffic costing system, and the development of a customer focused marketing organization.

Build Customer Focused Marketing Organization: Rather than corporatize and privatize its customer servicing functions, KTZ should transform its Center for Specialized Transport Services (CSTS) into a full, commercial, customer-focused marketing organization. KTZ has many of the pieces needed to develop a customer friendly organization. A customer oriented CSTS coupled with traffic costing systems, a commercial pricing process, and the customer service centers discussed in Section 4.4.6, will give KTZ an organization capable of managing customer contacts, marketing and pricing functions. In addition to new organization structures, CFTS functions will require the information systems investments to complete the customer service center functions and provide centralized billing and shipment management functions.

Implementation steps for building a customer focused marketing organization begin with assembling an organization along the lines shown below:



Other functions now within the CSTF should be grouped into these primary organization units, while other units may need to be added. Some existing CSFT units will be involved in the privatization process (station loading and unloading facilities, lifting equipment maintenance and operations, etc) and may no longer appear in the CSTS organization. The Marketing group may need legal support to develop the terms and conditions for service contracts.

With these organization structures in place, KTZ can acquire the traffic costing software, and, working with the accounting group, develop traffic costing data for major commodities and key customers. It can also develop a commercial pricing process, building the structures and financial analysis necessary to negotiate pricing structures with key customers and defend KTZ's pricing structures before government bodies.

6.1.2 Operations Analysis and Cost Reduction

Operating reform and cost reduction is the highest priority activity for the KTZ reform program. It is from initial cost reduction efforts that KTZ will generate the extra cash needed to fund the

investment programs that extend the reform process and continue cost reductions. The highest priority cost reduction activities are described below.

Quick Cost and Staff Reduction Program: The first step in all the cost reduction efforts should be to assemble a quick reaction team, with a member from each department. This team should concentrate on identifying the most egregiously under-used facilities (stations, terminals, depots, medical facilities, employee sports facilities, manufacturing plants, etc.) and developing a plan to quickly close and dispose of them either through sale, abandonment or other means. The team should work together to ensure coordination in efforts (*e.g.*, so the track department does not make plans to close some lines while another department is not planning to close its facilities on those lines). This same team should be charged with proposing staffing reductions that can be made quickly. Most will probably be at the under-used facilities being closed, but more reductions may be needed. This program should be designed to make a 10 percent reduction in staff, and a meaningful reduction in unnecessary facilities within the next six to eight months. Since the government has virtually ordered KTZ to make the staff reductions, KTZ should use this opportunity to have discussions with the government about the broad range of issues associated with restructuring in the short and long term. Issues to be raised with the government include: how displaced staff will be treated, who will pay their pensions, what will happen with railway provided housing, medical and educational care, and other needs. If government intends KTZ to pay these costs, KTZ should encourage the government to provide sovereign guarantees for financing these programs and a comprehensive employee retraining and relocation program from the proceeds of its future restructuring efforts. KTZ should not let this opportunity to involve the government directly in the restructuring process since government will be involved in many issues that must be addressed as the much more involved and vigorous reform program moves forward.

Operations Analysis and Operating Plan: The next, much more analytical step is to develop a new KTZ operating plan and identify the stations, terminals and facilities necessary to operate the plan. Once this analysis is complete, assets not needed for the revised operation should be closed, staff retrained, moved to where they might be needed or released under a staff reduction program. To conduct this analysis, KTZ should acquire (either through purchase or through a consulting contract) network operations analysis capabilities. These include software, hardware necessary to operate it, and training.[77] KTZ should also establish a high-level operations planning group to conduct the operations analysis and develop equipment utilization, staffing, facility and depot analyses necessary to sort through KTZ's operating assets, procedures, operating practices and train make-up methods. This group should report to the General Director and be staffed with personnel having operating experience, leadership ability, intelligence, and a willingness (no, eagerness) to change past practices. The group should include staff with computer skills, and experience in a wide range of railway operating disciplines including terminal operations, transportation operations, locomotives, locomotive drivers, rolling stock operations, and infrastructure.

The group will analyze railway operations to develop a new operating plan, including train schedules, locomotive assignments, marshalling terminals shunting assignments, locomotive driver crew assignments. The team should also develop a new plan for locomotive maintenance cycles

[77] Nearly all network train operations modeling programs run on PC workstations. The software is normally sold with a consulting assignment in which current railway operations are modeled. Typical costs for the hardware, models and initial operations modeling are about US$500,000.

and depot requirements, wagon maintenance cycles and their depot requirements. It should also analyze all passenger operations, working with the accounting department and the traffic costing systems to reduce passenger operations losses. The team should produce a quick analysis of unnecessary assets and begin to develop new operating practices for KTZ.

This is the core of the operating strategy development efforts recommended for KTZ and the extension of asset reduction and utilization improvement efforts. The operations analysis group should work with other reform groups to reduce KTZ train operations costs and improve operating efficiency. The initial work should require six months to complete. This work should be quickly followed with detailed analysis of traffic movements with the CSTS group to develop service proposals for major customers. The objective of this work is to encourage customers to enter into contract operations agreements with KTZ and to take on wagon fleet responsibilities or change loading or unloading methods to reduce operating costs. This work will continue for several years after the initial framework is established.

Asset Management: An equally important step for KTZ is to develop an asset reduction team. The function of this team is to identify assets that can be eliminated from KTZ ownership and operation and prepare them for disposition. Unnecessary assets should be disposed of as quickly as possible, either through privatization, return to the government, or through disassembly and salvaging of critical spare parts, scrapping of the remainder. The asset management group should include experts in transport operations, equipment management, facilities management, engineering and legal support. The team should work with government to develop processes through which KTZ can eliminate assets it no longer needs for continued operation. Initially, such assets should be easily determined and valued. Later, this group should work with the Operations Analysis and Operating Plan Group to further identify assets for disposal. At some point, this group should consider ways to enhancing the value of excess KTZ assets developed for sale. For example, the value of some assets can be enhanced through development, continuing contracts with KTZ, or transfer to customers in exchange for long term contracts for transport services.

This team would also be responsible for preparing KTZ units for privatization. This team should begin as quickly as possible and will eventually transform itself into a development department within KTZ.

Regional Operations Centers: KTZ should establish a team to develop regional operations centers. This work will include coordinating operations information systems activities, communications investments, investments in train control systems that will consolidate dispatching centers and establish organization structures and procedures to for the regional offices. Customer Service Centers should be co-located with locomotive management, equipment distribution and operations control functions. This will require the establishment of new organization structures and work management practices. Establishing and integrating these functions will be the primary function of this group. The investments necessary to establish these functions will require several years to develop, specify, acquire and install. During this time, the Regional Operations Center team should be developing the design criteria, organizational structures and practices that will be used. It should also have a direct role in developing and specifying how these systems should work.

The team will require members from signaling and communications, billing and accounting, information systems and operations. The team should travel to other railways with such service centers to see how they work and determine the critical requirements for use within KTZ.

Track Maintenance Practices Changes: This team should be composed of engineering and track maintenance managers willing to change existing practices. Taken mostly from the Infrastructure departments of KTZ, the team should investigate track maintenance work methods and equipment scheduled to be acquired with the EBRD loan. Members of the group should travel to Europe and North America or Australia to see different maintenance techniques and methods. Based upon this work and with the assistance of independent consultants specializing in track maintenance and work practices, this group should develop specifications for the equipment to be acquired. Equally important, the group should develop track standards, work practices, staffing requirements and new organization structures based upon the new work methods.

This work should be begun in the near term (next few months) so that KTZ can acquire and make good use of new track maintenance and inspection equipment at the earliest possible date. The group will also work with the Asset Management group to define the equipment and track maintenance functions that will be privatized (primarily renewals and new construction work). The group should also specify new materials standards for KTZ (for categories of track, for materials such as track fastenings, insulated joints, field welding methods) so that these materials and standards can go into effect as quickly as possible.

6.1.3 Investment Management

KTZ must limit its investment needs in the early part of the reform process if financial viability is to be sustained. The returns from several investments appear to be substantial and these investment programs should be progressed as quickly as possible.

Investment Planning & Management: KTZ must restrain its investment needs in the near term while it reduces costs. To ensure that KTZ manages its cash and investment plans carefully, it should implement a review process for investment. The review process should include requiring that proposed investments achieve substantial financial returns in the short term. KTZ should implement a post-audit of prior investments to determine if they are making the impact that was forecast for them when they were approved. If not, prior investment projects should be reviewed to determine what is delaying or reducing investment returns. Where possible, blockages or poor implementation should be fixed by replacing staff or changing the approval process. The Investment Planning group should work closely with the Operations Analysis and Operating Plan Group.

Key Investments: The most important investments for KTZ to transform its cost structure, based upon our review of KTZ's traffic and operating characteristics, are discussed below.

Track Maintenance Equipment: This investment will increase the life of costly track materials and permit KTZ to reduce track maintenance costs substantially over the next few years.

Diesel Electric Locomotives: KTZ's fleet of diesel-electric locomotives is in poor condition and expensive to maintain. The availability of a highly reliable and much more fuel efficient diesel locomotive fleet is a critical element of the program to reduce KTZ operating costs. The

replacement locomotives will reduce maintenance requirements, greatly improve fuel economy, require substantially less maintenance attention, while permitting new locomotive management techniques that increase the utilization of the locomotive fleet. Much higher utilization requires a much more reliable locomotive fleet. KTZ should analyze the costs and reliability of alternate locomotive acquisition candidates (rebuilt US locomotives, new from multiple sources, rebuilt and re-engined existing units).

Signal, Communications and Computer Systems: Investments in improved computer systems, integrated communications capabilities and centralized traffic control systems are essential for the implementation of several operations improvement projects. The integrated customer service and operations control centers reduce operating costs and permit system-wide (or, at least region-wide) management of trains and locomotive assets. Centralized driver management increases the utility and productivity of drivers and on-board crews. Similarly, centralized management and distribution of wagons and locomotives permits significant improvement in their utilization, making investments in new locomotives much more productive. The most important information systems requirements are for an integrated traffic management or train operating system (including waybilling and train consisting). Information for locomotive management and improved wagon distribution are a subset of the operating information systems. Similarly, information for fulfilling customer orders and tracking wagons. Wagon-to-train and locomotive-to-train assignments also depend upon operating information systems. These permit implementation of new operating plans and train schedules.

To implement these systems, KTZ should form an information systems task force to define new system requirements. Members of this team should travel to other freight oriented railways and systems suppliers to observe how they are used and define the major components for use in Kazakhstan. They should be assisted in this activity by outside consultants or experts in such systems.

Finally, centralization of dispatching centers will permit a reduction in the labor-intensity of train control functions and provide a focus for implementing changes in operations, locomotive and wagon distribution and local work order systems to place and pick-up customer orders.

6.1.4 Privatization

Privatization is central to KTZ's reform plans and to the programs recommended here. The term *privatization* is used in a general sense here to mean separation from KTZ and independent operation. We would recommend the maximum amount of privatization possible in the formation of multiple, competing, independent enterprises in the rail supply industry (civil construction activities, heavy track maintenance, medium and heavy repairs to wagons, locomotives and coaches, warehousing, local drayage, loading and unloading activities). Other activities, not directly related to railway transport, such as agricultural production, ballast manufacturing, concrete sleeper manufacturing, and other manufacturing that is currently done within KTZ, should also be separated and privatized where possible. In addition, assets no longer needed by KTZ should be closed, sold, or disposed of as quickly as possible. In this process, KTZ should take care that it does not create single suppliers upon which it must rely.

The Passenger business should be separated from KTZ's freight business and managed independently. We believe that this business should be provided with all the resources necessary

to provide passenger transport functions. This includes stations, facilities, locomotives and other rolling stock used to generate passenger transport. KTZ may find it desirable to separate passenger activities into more than one business unit. For example, commuter services businesses could be set up on a city-served basis, long distance passenger trains could be separated geographically, by type of service (high-speed intercity, provincial intercity services). The basis for such separation could be based upon whether the financial performance of such units would be significantly different or would require substantially different amounts of subsidy. The purpose of such a separation would be to clearly identify those services that the government wishes to support from those that can be self sustaining or that the government is not as interested in subsidizing. For example, in Argentina, the government subsidizes commuter operations on a company basis but subsidizes specific long-distance trains that would not otherwise be operated.

6.1.5 Summary: The Most Important Programs

In summary, the most important, highest priority programs KTZ should be pursuing are:

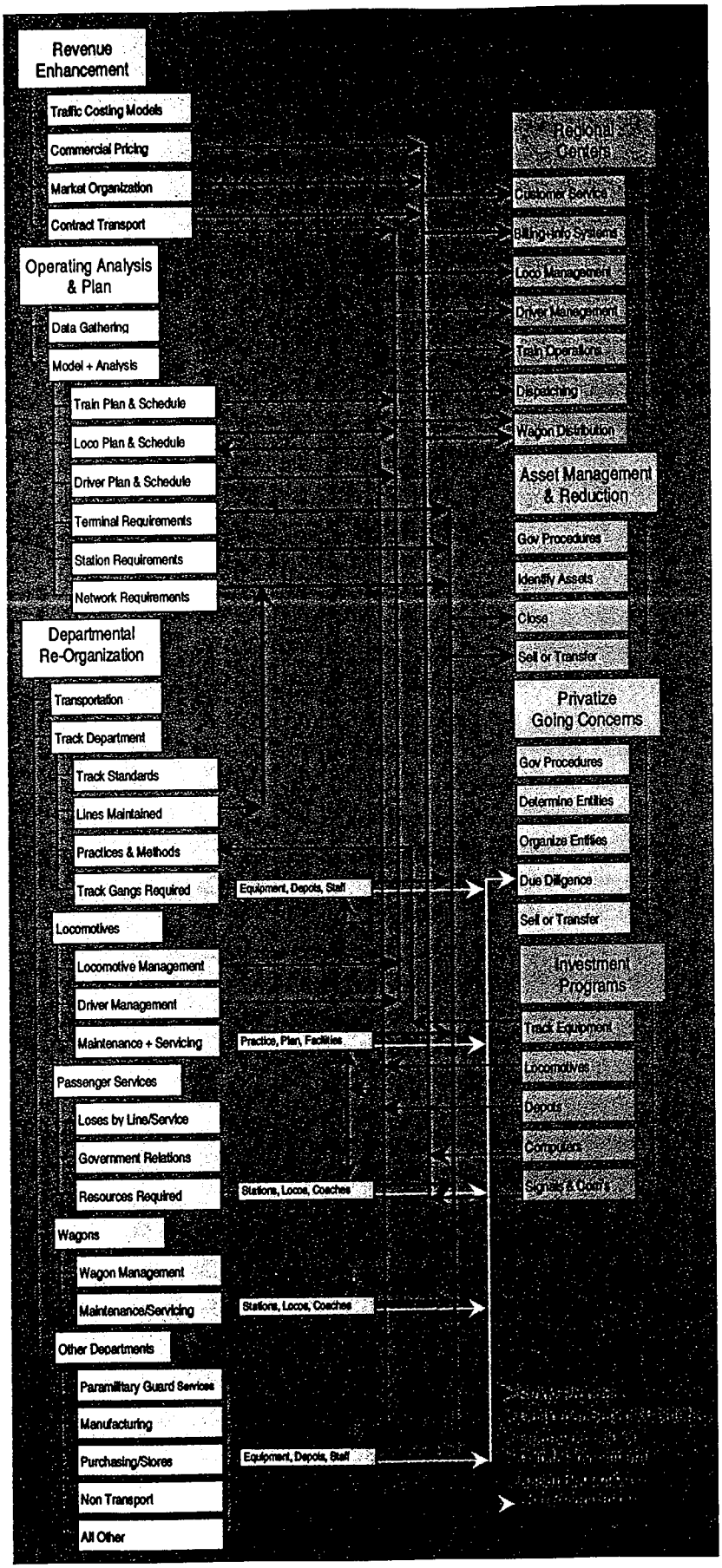
1. Quick Cost and Staff Reduction effort
2. Acquire Traffic Costing Systems
3. Commercial Pricing Process
4. Customer Focused Marketing Department
5. Develop New Operating Plan
6. Develop Asset Management Functions—Eliminate Excess Assets
7. Regional Customer Service and Operations Control Centers
8. Track Maintenance Changes
9. Investments In Track Machinery
10. Investments In Diesel Locomotives
11. Investments In Computer, Communications and Signaling Systems
12. Privatize Non-Core Businesses and Functions

To become and remain financially viable, KTZ must implement programs similar to these, and do so over the next five years. Implementation will be difficult to complete without entering into significant debt to finance the necessary investments.

6.2 Implementation

While each of the programs described above and others described in more detail in the body of this report are important, some can proceed much more quickly than others. The projects that should be implemented first are (1) projects requiring little financing, (2) projects with high financial returns, or (3) project that must be completed before others can be undertaken. The diagram on the next page shows the flow of work that can result in a rapid and informed implementation of the programs described above.

Many elements of the analysis and implementation are inter-related. While KTZ can begin eliminating excess assets right away, careful analysis and the development of new operating plans will be required to complete the the deep cuts in assets that are possible. Similarly, re-organization of the locomotive department will be required to separate locomotive management from driver management, an action that will help KTZ improve locomotive utilization significantly.



The process of disposing of unneeded assets and privatizing non-core units as commercial entities will also require significant planning and agreement with government about the procedures to be used. We have suggested earlier that the financing for early employee redundancies might be obtained from the World Bank. The World Bank will require significant and valuable assets as collateral for the financing. Many governments have satisfied this need by forming a settlement corporation to dispose of non-core assets and resettle redundant employees. The proceeds from the disposal of assets and sale of the entities are used to retire the World Bank loan. The World Bank loan is used to finance training, education, early retirements and employee buy-outs. Such an approach is suggested here.

Some parts of the reform program depend upon investment for implementation. Track maintenance reforms require new track inspection and repair machinery, increased locomotive utilization and a significant reduction in locomotive depots depend upon new locomotive acquisition. Similarly, new information systems, improved communications capability and consolidated train control functions all require investment. It is unclear to the consulting team whether the information systems investments KTZ has planned are the same as those recommended here. To be clear, KTZ should be investing in a transportation and operations information system, coupled with automated waybilling, equipment tracing and distribution systems, locomotive management systems, an operations modeling system, traffic costing systems, and driver management systems.

Implementation of these programs can be accomplished within a five year period. A proposed schedule is shown on the last page of this Chapter. KTZ should employ a coordinating consulting firm that has helped railways through this process in the past. KTZ should also select the best and brightest among its staff to assign to the many transition tasks. KTZ should also send many of these staff to western railways, particularly freight operations, to observe specific elements of the process for which they will be responsible.

To complete a successful reform process, KTZ must dedicate every effort on the process. Government, too, must be fully advised, and in agreement with the broad outlines of the reform program. We recommend that the government assemble a dedicated oversight team to deal with the many issues in law and property assignments, employee protection and rights, and changes in the competitive environment that will surely arise.

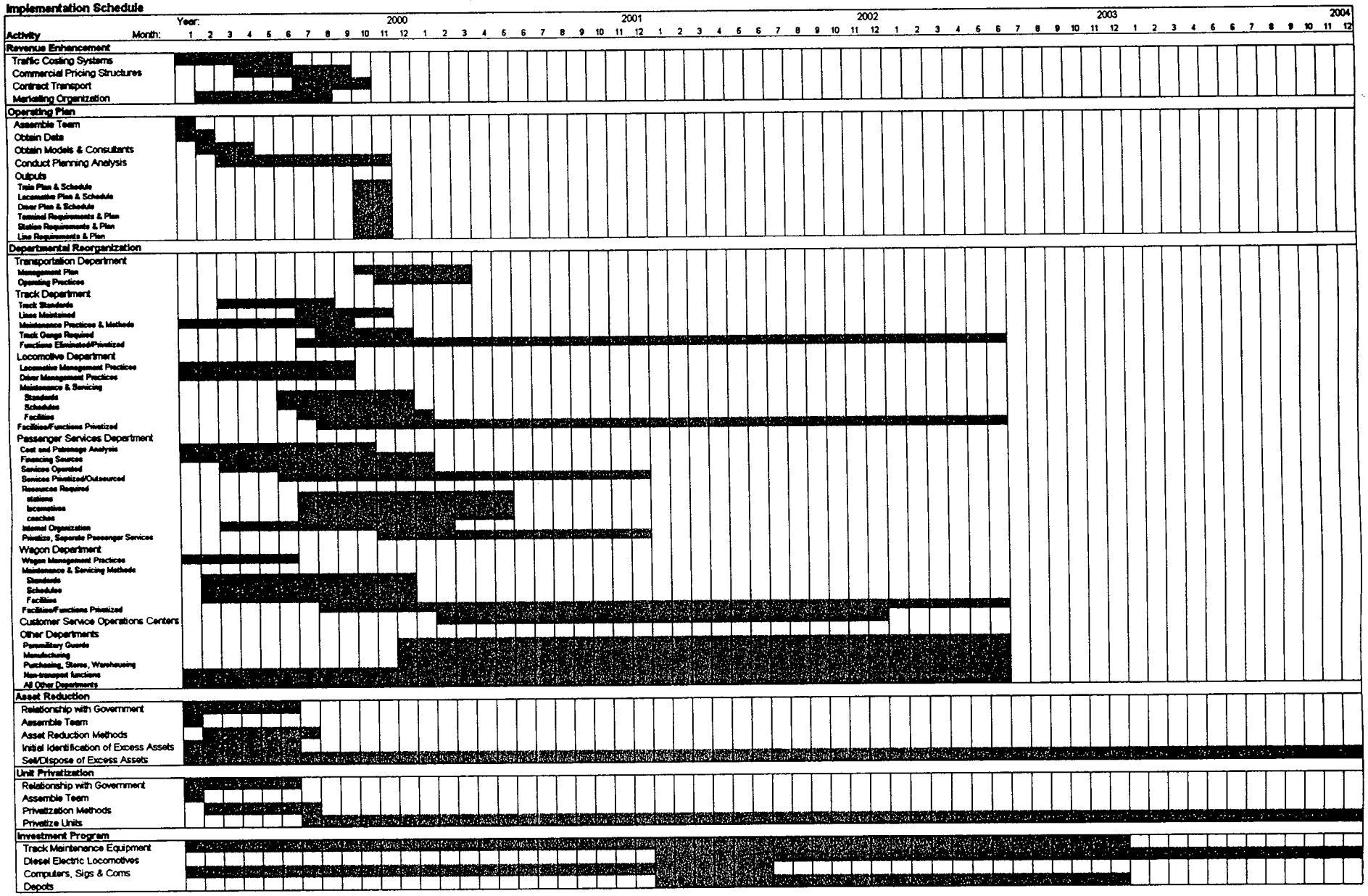
6.3 Transport Competition

As the reform process moves ahead, the government should carefully consider ways to increase rail transport competition. One of those ways would be to permit customers or other interested parties to acquire rolling stock and provide services over the railway network. This is a technique used in many countries to introduce competition in railways, and is a key feature of European Union railway reforms. The term used for this kind of competitive regime is open or controlled access—other entities have access to the railway infrastructure to provide themselves or others rail transport service.

The government has several important roles to play in such an environment. To ensure fair access, an independent government agency or unit often is used to certify operators and equipment. Entities seeking to operate trains over KTZ would be required to show that their drivers and employees were properly trained, and familiar with the operating environment. The Access seekers would also have to show that their equipment met minimum standards for reliability, safety and loading gauge (that is, they will fit where they intend to operate). Once an operator was certified by the agency, KTZ would be obligated to allow them to operate over the network. This certification process will keep the dominant railway from excluding competitors by rejecting equipment or operators for minor deviations or by frequently changing the rules.

The government also may have a role in regulating how access prices are determined and how disputes are settled. Many governments have required that railways keep separate books for the cost of infrastructure and regulate infrastructure pricing to ensure an adequate return on investment. The parties may also agree to use an arbitration procedure to settle price and rights disputes between them.

Given the dominance of rail transport within Kazakhstan, the consultants believe that the government should support encourage some form of access. This would provide sufficient competition power KTZ's reform program beyond the first few years.


Implementation Schedule
Year:
2000
2001
2002
2003
2004
Activity
Month:
Revenue Enhancement
Traffic Costing Systems
Commercial Pricing Structures
Contract Transport
Marketing Organization
Operating Plan
Assemble Team
Obtain Data
Obtain Models & Consultants
Conduct Planning Analysis
Outputs
Train Plan & Schedule
Locomotive Plan & Schedule
Diesel Plan & Schedule
Terminal Requirements & Plan
Station Requirements & Plan
Line Requirements & Plan
Departmental Reorganization
Transportation Department
Management Plan
Operating Practices
Track Department
Track Standards
Lines Maintained
Maintenance Practices & Methods
Track Gangs Required
Functions Eliminated/Privatized
Locomotive Department
Locomotive Management Practices
Diesel Management Practices
Maintenance & Servicing
Standards
Schedules
Facilities
Facilities/Functions Privatized
Passenger Services Department
Cost and Patronage Analysis
Financing Sources
Services Operated
Services Prioritized/Outsourced
Resources Required
stations
locomotives
coaches
Internal Organization
Privatize, Separate Passenger Services
Wagon Department
Wagon Management Practices
Maintenance & Servicing Methods
Standards
Schedules
Facilities
Facilities/Functions Privatized
Customer Service Operations Centers
Other Departments
Paramilitary Guards
Manufacturing
Purchasing, Stores, Warehousing
Non-transport functions
All Other Departments
Asset Reduction
Relationship with Government
Assemble Team
Asset Reduction Methods
Initial Identification of Excess Assets
Sell/Dispose of Excess Assets
Unit Privatization
Relationship with Government
Assemble Team
Privatization Methods
Privatize Units
Investment Program
Track Maintenance Equipment
Diesel Electric Locomotives
Computers, Sigs & Coms
Depots

APPENDIX I: KTZ INVESTMENT PLAN SUMMARY

A1-1 Infrastructure Renewal and Development

KTZ has developed a program to renew critical elements of its track infrastructure, many of the proposed renewal programs occur along international transport corridors which also connect the most important industrial centers of the country. More than 55% of KTZ revenue involves movement of international freight traffic. The renewal work is focused on retaining KTZ's core railway network and extending its capabilities for international trade. The renewal work, coupled with a stepped up program of routine track maintenance, is concentrated on speed-limited sections to improve transit times and increase capacity on the most important sections.

A1-1.1 Central Corridor

The Central Corridor is an important segment of the Trans-Asian Railway. It links Druzhba, on the Chinese boarder, with Almaty, Shymkent and Chengeldy. Freight traffic density along this corridor varies from about 1.1 million-tonnes on the Druzhba-Aktogai section to 17.3 million-tonnes on the Zhambyl-Shymkent section. KTZ's track maintenance personnel report significant track condition limitations on the Druzhba-Aktogai section. In this section, 301 of 312 kilometers have speed limitations due to drainage and surface problems, and poor condition of wooden sleepers (rail in most of the section will not require replacement due to the light tonnage on the line). Speed limitations cover some 50-kilometers of track and 41 bridges in the segments from Aktogai-Chengeldy.

A1-1.2 Northern Corridor

The Northern Corridor includes lines in central Kazakhstan between Kokchetau, Astana and Aktogai and which contain KTZ's most important freight traffic origination points including Karaganda, Ekibastuz, and Astana. In the past, this corridor carried significant transit traffic moving across the former Soviet Union. Currently, there is almost no transit traffic, although some import/export freight traffic moves to and from power plants in Russia. The Lokot-Kulunda section of the Russian railway has been closed to KTZ domestic traffic, which now flows to Astana and over the Mointy-Aktogai line. The corridor carries coal, steel and grain traffic and is the heart of KTZ's freight services. The single-track section from Mointy to Sayak to Aktogai is capacity limited due to poor condition of sleepers and rail, which has resulted in 40-kph speed restrictions over much of the line. There has been some discussion about adding double track to this section during this investment plan period. The section between Kokshetau and Zharyk has more than 45-km of 40-kph speed restrictions.

A1-1.3 Central Asian Corridor

This corridor is former main line of the West Kazakhstan railway. It runs from Chengeldy to Kzyl-Orda, Aktyubinsk and Uralsk. The Central Asian Corridor connects Uzbekistan and other Central Asian Republics with Russia and Europe. In the past, much heavy freight traffic to and from the Northern Corridor traversed Russian lines between Tobol and Nikel-Tau. Most of that traffic now must travel via Mointy, Chu, and Arys, then across the Central Asian Corridor. Similarly, traffic from Eastern Kazakhstan must now be routed via the Central Asian Corridor rather than old routes through Lokot and Tobol. KTZ expects that access to these alternate routes through Russia will continue to be limited by tariff and boarder-crossing barriers. As a result, Kazakhstan's Central Asian Corridor route will continue to be important in maintaining communication with Russia and Europe. Currently, this is one of KTZ's most dense passenger corridors, with some 20 pairs of trains per day. A significant portion of the passenger traffic is transit traffic between Russia and Central Asia. Over the next few years, passenger traffic is likely to decline and there will be sufficient traffic on this largely double-track route.

About 60 kilometers of this line have speed restrictions of 40-kph or more. The worst section for maintenance is between Iletsk and Ozinki. The section closest to reaching capacity is between Chiili and Kzyl-Orda. There has been some discussion of adding a second track between Kandagash and Ayrs (on the Central Corridor).

A1-1.4 Western Corridor

The Western Corridor crosses the northwestern part of Kazakhstan from Atyrau to Kandagash and includes the Makat-Benjeau-Aqtau line. The line has two large industrial cities—Mangistau and Atyrau. It serves the heart of the Kazakhstan's Tengez oil fields and carries significant international petroleum traffic. In the past, the line carried significant transit traffic on the Beineu-Makat-Akasari segments but this traffic has dropped off over the past few years as KTZ increased transit tariffs. The port at Aqtau has received considerable international financing and traffic growth through this port can be expected over the next few years. Traffic increases on this route are expected to be exports of oil, wheat and metals. Additional traffic is possible on the route resulting from transit traffic switching from the Central Asian corridor to move via Bejneau and the port at Aqtau.

Traffic levels are currently well under the capacity of the lines. There are speed restrictions of 40-kph or less over some 238-kilometers on this corridor (out of the total 1,250-km). The worst sections are Makat-Yeralievo section, some 191-km, due to poor sleeper condition, soft ballast and some worn rails. Additional traffic hazardous materials traffic is expected on the Aqtau-Benjneau-Makat section. It is necessary to repair some 500-kilometers of this line to maintain safety on this line. These repairs will also assure lines speeds over 40-kph.

A1-1.5 Summary Track and Infrastructure Investments

The KTZ investment plan proposes to spend some $690 million on infrastructure renewals. This includes $570 million for general track renewals, $86 million to strengthen the Drushba-Presnogorsk line, $26 million for bridges and artificial structures, $9 million for roadbed improvements.

KTZ has begun to use secondhand materials (mostly rail) in its track renewal programs. This reduces overhaul costs by some 80% from the cost using new materials (from some $300,000-per-kilometer to about 50,500-per-kilometer[2]). KTZ plans to use secondhand material for as much as 70% of its overhaul volume. KTZ has estimated that the minimum amount it should be investing in track renewals (overhaul, medium-scale renewals, and lifting) over the next five years is as follows:

	(US$, 000)		
Corridor	**Minimum Renewals Total**	**Only Lines with Speed Restrictions**	
Central Corridor	$ 79,000.	$ 7,800.	Druzhba-Aktogai
Northern Corridor	76,900.	22,400	Sayak-Mointy
Central Asian Corridor	108,000.		
Western Corridor	86,000.	42,200.	Makat-Biejneau
		23,600.	Biejneau-Mangyshlak
Total	**$349,900**	**$96,000.**	

KTZ's track engineers have advised that KTZ must overhaul some 270-kilometers of track annually with new materials. At these volumes, the cost of such overhauls (including wages, materials, machinery and equipment maintenance and locomotive rentals) is about $265,000 per kilometer.[3] They also advise that they should perform mid-term strengthening on about 440-kms per year. The total cost of these renewals over the five-year period is projected to be $570.2 million. This amount is included in the KTZ investment plan. Strengthening of the Almaty-Astana line for higher-speed passenger services is not included in this amount. This project is expected to cost $125.5 million in total. It is not in the KTZ minimum investment plan.

Based upon our analysis, we believe there has been some double counting of renewal investment needs in both the KTZ minimum and maximum investment plan and that the renewal program spelled out above includes renewals to major lines. The new plan to develop renewal criteria

[2] *ibid,* page 8

[3] *ibid,I* page 8. This seems strange since just a paragraph earlier it was claimed that overhauls cost about $307,000)

based upon line use is an excellent plan but too new to have been taken into account in the development of the proposed investment plans.

A1-1.6 Strengthening of Druzhba-Presnogorkovskaya Line

The Infrastructure renewal and strengthening investments, described above, appear to include strengthening the line from Druzhba through Aktogai, and between Sayak and Mointy.[4] Even so, the Minimum investment budget includes an additional US$86 million for this work. Much of this work would seem to duplicate that included in the US$570 million and some of the Almaty-Astana line's estimated $125.5 million cost. The Investment plan contains some comment about investing some $28,9 million for Druzhba Station capital construction but it does not appear in the list of investments on page 20 of the Investment Plan.

Investments like this are difficult to understand on a line that KTZ projects to carry 0.4 million net-tonnes and possibly as much as 6 to 8 million tonnes by the end of the period only in the most optimistic scenario. The work on this line should be reviewed and merged with the renewal programs for other lines, based upon condition of the line and the traffic need for upgrading standards. In the interim, KTZ should review the standards used to assign lines to track categories and the standards of those categories themselves. A line should not be upgraded at great expense with new materials because it is an important international link unless traffic is actually traveling over that link. It appears to us that for the foreseeable future, the Druszhba line should be maintained in good condition at a medium speed (say 60 kph) using used materials rather than new. As traffic builds on the line, there will be sufficient time (and money from the increasing traffic) to upgrade the line to a higher standard.

A1-1.7 Other Infrastructure Investments

The KTZ investment plan includes US$ 26 million for the overhaul and capital maintenance of bridges, junctions and other "artificial facilities". The investment plan also includes spending of about US$ 10 million for sub-ballast and "ground-bed" improvements.[5] An additional investment of US$1.1 million is provided for aluminothermic, or Thermite, welding of rail. These investments have been included in the proposed investment plan.

A1-1.8 Financial Implications of Infrastructure Investments

The impact of KTZ's track renewal investment program is reflected in the financial analysis in several ways, most are related to train speeds. Note that several other restructuring programs also tend to increase average train speed, including the transfer of lightly used facilities and lines. An increase in train speeds impacts the number of locomotives required to provide services, improves the productivity of locomotive drivers—reducing the number required for a given level of service, and improves wagon and coach utilization—reducing the number of wagons and coaches required for a given level of services. The reduction in rolling stock fleet has a follow-on impact on workforces and materials required for their maintenance, these impacts, however, are small.

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[4] *ibid,* page 20. this investment is listed in the schedule for Minimum Scenario for KTZ Investment Needs, along with the US$570 million for track renewals, itself some $220 million more than the minimum investment schedule shown on page 8.

[5] *ibid,* both investments are discussed on page 9 and in the tables on pages 19 (maximum investment scenario) and 20 (minimum investment scenario).

There could be other impacts that have not been considered in the financial analysis. These include any service elasticity of demand, which could increase traffic levels slightly if train speeds and service levels improve. This effect is considered to be too small to have an impact within this forecast period. A secondary impact is in the reduction of train derailments and emergency maintenance spending for poor track condition. KTZ has few train derailments but the impact of improved track condition on regular track maintenance could be significant. This would tend to reduce spending needed for normal track maintenance but this will require several years to have a significant impact.

A1-2 Locomotive Investments

KTZ's locomotive fleet consists of some 2,300 locomotive units. The current total is down some 383 units from 2,674 KTZ reported owning in1996. The fleet is aging and many locomotive

Locomotive Type	Owned
Electric-main line	644
Diesel-main line	1,051
Diesel-shunting	596
Total	**2,291**

units are out of service (a reported 30% to 40% of the fleet is out of service). Many locomotive units have been retired from service and currently serve as a storage house of parts for maintaining other locomotive units. The diesel fleet is in greatest need of attention. More than 60% of KTZ's main line diesel fleet is 18 years or more old. This is the design life of KTZ's diesel-electric locomotives. KTZ has retired the worst diesel locomotives and many more need to be retired. Parts supply for the existing diesel locomotive fleet is increasingly difficult to secure.

The largest part of the mainline diesel fleet is composed of 2TE10 locomotives from Ukraine and Russia. These units are not very fuel-efficient and are becoming increasingly unreliable and difficult to maintain. KTZ has several choices in dealing with its aging fleet of diesel locomotives: Continuing to maintain and operate the existing fleet; rebuilding the existing fleet using new fuel-efficient diesel engines; buying new locomotives.

	Cost Per Locomotive (US$ 000)		
	Operating $/year	Investment	Life (years)
Continue use of Existing Fleet	$850	-	5 ?
Upgrade/Overhaul Existing Fleet	$350	$ 2,000	15
Purchase New Locomotives	$234	$ 3,000	25

Each choice has benefits and drawbacks. The existing fleet is not efficient and is difficult to maintain. Rebuilding with new prime-movers requires significant investment and extends the life of the rebuilt unit by some 10 to 15 years. Buying new locomotives also requires significant investment but provides a locomotive with a 25 year life, improved fuel economy and reduced maintenance costs. The differences between options are best determined by considering the life-cycle costs of the alternatives—what each costs to own and operate over an extended period, discounting the differences between them to consider the net-present-value of each option. KTZ

has prepared the data in the table above based upon its understanding of life cycle costs. The most economic choice will depend upon issues such as the availability, tractive effort, speed, and adhesion limits as well as on operating costs, investment requirement and expected life.

KTZ should also consider the acquisition of used third-generation locomotives from either GM-EMD or GE-TSD (*e.g.*, SD70-3 or 44C Dash-8s). Such units are relatively young and would be rebuilt and converted to KTZ gauge in KTZ workshops. Modernized second-generation locomotives should also be considered (GM-EMD SD-40-3s, or GE 30C Dash-7s). Many of these units are available on the market at very low prices (a rebuilt SD-40-2 can be purchased for about US$ 500,000 in good condition). A life-cycle analysis should be conducted to determine the best investment alternative. The KTZ Investment Plan contemplates spending $480 million over five years for 160 new locomotives (or about US$3 million each). This is an aggressive investment program and strains KTZ's financial resources. The investment program we propose provides for the acquisition of some 100 locomotives, at an average cost of US$ 2 million each, over the four year period between 2001 and 2004. This puts about 75 units and US$150 million in the five year investment program ending in 2003. Over the period, the investment program contemplates the acquisition of 175 diesel-electric locomotives and 100 new electric locomotives. By the end of the period, KTZ's diesel-electric road fleet is entirely composed of new units (175 new out of 175 required). Shunting units are rebuilt. The total diesel fleet is expected to be about 200 units. The electric fleet has 100 new units out of a total required fleet of about 330 units.

KTZ proposes to overhaul diesel locomotives, at a rate of 18-units per-year, at its major locomotive overhaul depot at Chu. According to KTZ plans, this will not require new investment in the facilities at Chu. However, we believe that any replacement diesel-locomotives will require considerable work for conversion for use in Kazakhstan—even new units should be assembled in Kazakhstan. For this reason, our proposed investment plan includes US$20 million in investment upgrades to a diesel-locomotive facility, probably at Chu.

KTZ also proposes to overhaul electric locomotives at Atbasar, overhauling 28 units in 1998, and increasing that capacity to 60 units in 1999 and 70 units in 2000 and beyond. This will require improvements to the Atbasar Electric Locomotive Depot. KTZ has estimated the cost of these improvements at US$ 17-million. Overhauled locomotives are assumed to have a lower out-of-service rate but the same general operating costs. In addition, KTZ plans to acquire 200 pulse-capacitors for starting diesel-electric locomotives, permitting them to be shut down between service runs. The 200 pulse-capacitors are expected to cost about US$1.2 million.

A1-3 Track Machinery Investments

KTZ currently has a fleet of some 851 track maintenance machines. Of these, some 348 units (or about 41%) are out of service and worn out beyond repairing. KTZ has insufficient track maintenance machinery to conduct the maintenance program contained in the budget. New equipment will be required.

KTZ's investment plans include an investment of some US$ 100 million for new track maintenance machinery. This includes some $29 million for three mechanized surfacing gangs[6],

[6] The maximum investment plan shows an investment of US$29 million in the list of equipment shown on the next page while the minimum investment plan shows an investment of US$36 million for essentially the same

$60 million for various pieces of track maintenance equipment, $8 million for some kind of rail-head recovery equipment, and $3 million for rail lubrication and other equipment.

The KTZ investment plan describes the equipment investments in the context of significant changes proposed to the track maintenance department. KTZ proposes restructuring and potential privatization of major track maintenance groups (renewals work forces). It also plans to change management organization and maintenance methods for basic track maintenance work. KTZ's plan describes track categories and defines new maintenance standards for track categories. Many of these changes will be effected using the track machinery investments described in the investment program.

The first $29 million investment appears to be for the acquisition of equipment for track renewal and major production maintenance work, the work done by the TMS units discussed in Chapter II. These funds would be spent as shown in the chart below.

	Investment Amount ($ millions) by Corridor			
Proposed Equipment	**Central**	**Northern**	**Central Asian**	**Total**
Ballast Cleaning Machine	$ 3,000	$ 3,000	$ 3,000	$ 9,000
Tamping/Lining Machine	$ 1,600	$ 1,600	$ 1,600	$ 4,800
Planning/Profiling Machine	$ 1,200	$ 1,200	$ 1,200	$ 3,600
Dynamic Track Stabilizer	$ 1,500	$ 1,500	$ 1,500	$ 4,500
Rail Profiling Machine[7]	$ 7,000	-	-	$ 7,000
Total	**$14,300**	**$ 7,300**	**$ 7,300**	**$28,900**

The US$ 60 million for KTZ track department equipment includes the equipment listed above as well as a track inspection vehicle, rail-grinding train, rail-head contouring equipment (stationary?). The track inspection and rail grinding equipment are designed to extend the life of rail and help more precisely determine locations for track renewal work. The US$ 60 million investment program also includes funds to mechanize KTZ's more routine track maintenance forces with hy-rail vehicles, power hand tools including rail drills, saws and smaller tamping equipment. Acquisition of this equipment will improve the productivity of regular track maintenance forces.

KTZ plans other track equipment investments totaling an additional $11 million. The investments include $7.5 million for rail recovery equipment. The rail recovery equipment will allow KTZ to increase its use of second-hand rail and to transpose rail in curved sections. The investment also includes about $0.5 million for mobile rail lubrication equipment. Other investments include alumino-thermic welding equipment and contingency funds.

The US$60 million investment specifically includes the track surfacing equipment that is also shown in the separate US$ 29 million list. It should be noted that the US$ 60 million investment in track equipment is only about one-third of the equipment that KTZ will require to maintain the entire network to the new standards and with these new methods. However, based on the our

equipment. We believe the $36 million in the minimum plan was miss-stated and, in fact, refers to the same equipment.

[7] *ibid,* page 11. This item is listed as "a line for recovering the profile of the rail head (fixed)" and may be a grinding machine at a rail welding plant.

discussions with KTZ, we believe the KTZ prepared investment plan mistakenly duplicates many track investment programs. KTZ actually intends initially to invest only US$60 million, not the US$100 million shown in the investment plan. The proposed investment plan prepared for the EBRD loan includes an additional US$120 million investment in track maintenance equipment to cover the entire KTZ network. Benefits from this equipment will extend maintenance savings to the rest of the network.

KTZ plans to reorganize its track department regular maintenance forces at the same time that it separates Track Machine Sections from the Track Department and moves them into an SSE[8]. This restructuring will also affect the organization of KTZ's regular track maintenance activity, its supervision and productivity. However, the details of the restructuring program for regular track forces are undetermined at the present time. No supervisory productivity improvements have been assumed at this stage, some labor and material productivity improvements have been estimated.

In addition to allowing KTZ to carry out its proposed track renewal and overhaul work, the proposed equipment produces specific savings. The ballast cleaning machines reduce the amount of ballast that must be purchased, eliminate the task of separately plowing out the fouled ballast and transporting and delivering new. KTZ estimates the savings to be in the range of $1.8 million annually per machine. As a part of the renewal program, KTZ plans to change the type of rail fastening system it uses (VOSSLOH instead of the existing type used by KTZ). KTZ projects that this will result in savings of about $ 1,400,000 annually.[9] The use of the Zheismar equipment for rail recovery (the Rail Profiling Machine?) is estimated to produce direct economic savings of some $4.3 million annually in the recovery of worn rails for second-hand use. The rail lubrication equipment will reduce rail ware and improve energy efficiency by about 4% overall (both electric and diesel locomotives).

A1-3.1 Financial Implications of Track Machinery Investments

The impact of the investments in track machinery has been reflected in the financial analysis in several ways. First, the new equipment permits the use of more cost-effective maintenance practices, reducing the cost of track maintenance work (both basic maintenance and renewal maintenance activity). These lower costs allow more track renewal work to be completed for the same amount of money. Improved track condition is reflected in increasing train speeds, reduced rolling stock needs and increased productivity of locomotive drivers.

Next, the new equipment increases the productivity of both renewals work and basic track maintenance work. The labor productivity of renewals work is projected to double as a result of the acquisition of new equipment and implementation of new maintenance methods they envision (including track inspection rail flaw detection equipment). In addition, the new maintenance methods and proposed equipment will increase the effective life of track materials. Rail grinding and improved rail husbandry through rail flaw detection, transposing rail on curves, and rail

[8] See Chapter II, specifically, section 2.1.5 for a discussion of KTZ's proposed track restructuring plan.

[9] *ibid,* page 18. It is not clear what this change is or what the savings represent. However, KTZ used a standard and very complex 10-piece rail fastening system in the past. Modern 5 or 7-piece fastenings will reduce costs and make rail changing easier.

lubrication can increase the life of KTZ rail by a factor of 2 and possibly by a factor of 4[10] over time. The projected material life extensions will occur over a long period of time. Materials life extensions have been reflected in the financial analysis by a 30% increase in the assumed life for all track materials over the period. Over time, the impact of new techniques, tools, equipment and practices has the potential to increase track materials-life more significantly.

The labor productivity of basic maintenance work is expected to increase by 5% per year for a three year period, or about 16% overall. Wages for track department employees is estimated to increase by 13% by the end of 2003 to reflect the increasing productivity. Further substantial real increases in wages are assumed (real increases of 4% per year for the entire period after 2003.

Track Department Spending and Employment

Category	Actual 1998	No Action 2003	Restructuring 2003	+Investment 2003
Spending, Tenge 000s				
Labor + Social Benefits	4,108	4,117	3,665	3,505
Materials	8,581	8,776	8,561	5,738
Total Spending	19,724	19,927	18,660	15,561
Employment				
Basic Maintenance	16,557	16,705	15,451	14,464
Renewals Staff	3,176	3,233	2,559	1,593
Supervision & Other	7,968	8,051	6,926	6,175
Total Employment	27,701	27,989	24,936	22,232
Physical Measures				
Track Kilometers	26,926	26,926	24,276	24,338
Tonne-kilometers (000,000)	133,200	126,661	130,889	128,585
Tonnes (000)	152,471	159,286	166,833	166,833

The impact of all changes, including the asset reduction program which eliminates some light density lines and station and yard tracks (which only affects basic maintenance forces and supervision) can be seen in changing employment and materials consumption estimates. Total savings are estimated at US$ 50 million annually by 2003, increasing there after as traffic grows and materials life lengthens.

Labor, material costs, and employment are also affected by railway traffic and network size. There are slight differences between various alternative scenarios. They are shown above. Network size is reduced in as a part of the restructuring alternative but increases by 71 kilometers with the investment program, reflecting the new line constructed in the northeast[11]. Tonne-kilometers decline after 1998 reflecting a decline in total traffic, changes in network size and traffic re-routing over the new line in the northeast.

[10] KTZ is reported to obtain about 500-million gross-tonnes from its rail. Railroads using new rail husbandry techniques have reported rail life of more than 2-billion gross-tonnes under more adverse conditions and higher axle loads. The quality of the metallurgy of KTZ rail is unknown so a more conservative estimate has been used.

[11] The investment plan includes the construction of the Aksu-Konechnaya railway line. See section 4.3

A1-4 Aksu-Konechnaya Railway Line

KTZ proposes to spend about $ 71-million to construct a connection between the Central Corridor and Northern Corridor. The line will connect power facilities in Ust-Kamenogorsk and Semipalatinsk with the coal-fields at Ekibastuz. In the past, this traffic moved via Kulunda and Lokot over a segment of the West Siberian Railway. This route is now in the Russian Federation and movement over it is expensive and traffic is often delayed at the border crossings. The proposed new route is some 100-kilometers shorter than the route via the West Siberian Railway. The alternative routes, all within Kazakhstan, require an extended trip through Mointy and Aktogai. The new route is some 400 to 1,500 kilometers shorter for traffic that moves via the all KTZ route. The new route will also be used by Ekibastuz coal traveling to the Almaty region, traffic that is expected to increase in the future. In the proposed investment plan, this line is constructed between 2004 and 2007. The line could be built earlier if financed by shippers who will benefit from the shorter hauls.

In the financial analysis, it was assumed that some 6-million tonnes would move via this route by 2007 and that the haul length would be reduced on this traffic by some 400 kilometers. It was also assumed that prices for coal transiting this line would be higher on a tonne-kilometer basis, but much lower for shippers on the basis of price-per-tonne. An 8% increase in average coal prices was assumed to generate the revenue necessary to pay for the line. Even so, unless the line will induce new demand, it is difficult to see how KTZ's financial position will be improved significantly by construction of this line.

A1-5 Wagon and Coach Investment Programs

KYZ's proposed restructuring program will transfer many major wagon depots to Zheldorremmash, SSE. As a part of this program, minor and outlying wagon depots will be closed. In addition to these changes, KTZ's investment program includes several wagon and coach related investment elements. The first is the completion of an already underway investment in the tank wagon construction and overhaul depot at Atyrau, near the Tengeze oil fields. About US$ 11-million has already been spent on this effort and US$ 2-million is needed to complete sufficient work to permit the overhaul of 500 tank-wagons per year at the shop. The work includes washing and cleaning facilities as well as wagon repairs. When the expansion work is completed, the depot will continue to conduct wagon repairs but will also be able to overhaul tank wagons. The reconstruction will expand the working area and equip the workshop with modern tools and wagon overhaul equipment. Little in the way of savings are projected as a result of this investment. Petroleum products are one of KTZ's largest commodities and the workshop will ensure the continued supply of serviceable tank wagons.

KTZ plans a small investment in machine to weld wagon and locomotive tires to wheel blanks, producing a two or three turn wheel. This will reduce wagon and locomotive out of service time for wheel maintenance and reduce wheel costs. Four machines are proposed, for major wagon overhaul depots in each region. The four machines are expected to cost $0.5 million in total.

The KTZ investment plan includes US$ 87-million for rolling stock overhaul activity. This program, coupled with the asset reduction elements of the restructuring program, will work to reduce KTZ's total wagon fleet ownership from approximately 58,400 in 1998 to 38,500 in 2003 while handling increased traffic (KTZ's wagon fleet has been reduced from 105,200 in 1996 while

traffic increased in 1997. This is largely done through the retirement of excess wagons but the overhaul program keeps wagons in the fleet in good repair. Wagon out-of-service rates decline from an estimated 33% in 1998 to a projected 10% in 2003.

KTZ operates some 2,345 passenger cars. It estimates that this equipment should be overhauled about every 5 years. KTZ is completing a new passenger-carriage overhaul facility in Almaty.[12] Some US$ 2.8-million has been invested in the facility, an additional US$ 31.3 million is budgeted to complete the facility. The restructuring plan is likely to reduce the fleet of passenger carriages needed and KTZ intends to move the passenger carriage overhaul depots into and SSE and eventually into the private sector.

A1-6 Signaling and Communications Investment Program

KTZ has an extensive signaling and communications network. The investment plan proposes to invest some US$ 18.5-million in upgrades to the communications network. The upgrades involve installing high-speed digital communications lines of fiber-optics or copper-cable systems, depending upon the route and capacity requirements. The upgrades include installation of digital switches and improvements in the UHF radio network used to communicate with trains. Proposed investments include:

Segment	Length Kilometers	Medium Proposed	Estimated Cost (US$ 000)
Aktogai-Druzhba	300	fibre-optic	(Japanese grant)
Arys-Chiili	277	copper cable	4,500
Ayaguz-Semipalatinsk	270	copper cable	4,500
Almaty-Chu	330	fibre-optic	5,500
Switches at large stations	na	digital (12,000 numbers)	4,000
Total			**$ 18,500**

KTZ proposes to install centralized automated dispatching systems over many routes. Many KTZ lines, while signaled, do not have automated, centralized control systems. By installing these systems, KTZ hopes to centralize the control of operations into three centers, Astana, Almaty and Aktyubinsk. Finally, a center for traffic management would be created in the Central Traffic Department, probably in Almaty. This program is expected to cost US$ 11.7 million and will be completed in three stages between 1999 and 2002.

A1-6.1 Financial Implications of Signaling and Communications Investments

The improved communications systems are needed to provide the medium for the dispatch consolidation. Replacement of older systems with solid-state digital systems will reduce maintenance costs and improve network reliability and data transmission speeds. The consolidation and automation of dispatching systems will permit KTZ to close smaller control stations and improve the control of train operations throughout KTZ's mainline network. An improvement in transit times and average velocity is anticipated (as train delays are reduced). Staff reductions associated with train control and dispatching should amount to about 530

[12] The new passenger carriage overhaul facility in Almaty has been financed by a Japanese loan.

positions. Total reductions resulting from station closings, asset reduction and the automated dispatching system are estimated at $ 11-million annually.

A1-7 Other Investments

The investment program includes investments several different areas totaling more than US$100 million over the five year period.

KTZ plans to spend about US$ 1-million on power control systems. These investments include the development of an SINET system (?), the installation of Alpha meters for power control and system to reduce parasitic losses from the electrical overhead. These projects are said to reduce power costs by some 2%.

The Investment Program proposes an investment of US$ 25-million for improvements in information systems. These investments include the completion of the introduction of the SAP R/3 accounting and purchasing control system and the replacement of outdated hardware. Additional investments will arise from the signaling and communications systems upgrades discussed in section 4.6 above as well as process changes and automation of processes in other departments over the next 5 years. We have assumed that this investment also funds the acquisition of a transportation information system to automated billing, provide operating information, help in determining train makeup, improve wagon record keeping and automate such accounting functions as payroll and time-keeping.

KTZ has budgeted about US$ 68 million for overhaul of buildings and facilities during the next five years. Even given the significant changes planned in KTZ's organization structure and the number of buildings and facilities likely to be affected, this seems like an excessive amount. The investment plan contains no description of specific spending proposals. We propose to reduce those investments somewhat.

Other Investments	US$ (000)
MIS & Computer Systems	$ 25,000
Power Control Systems	1,000
Building & Facilities Overhaul	68,000
Other	8,100
Total	**$102 ,100**

KTZ's investment plan includes water supply, research and design, and engineering investments. Other investments include completion of a water conduit (US$ 4.6-million) and design, research and development groups (US$ 3.5 million).

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